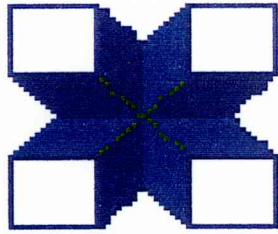
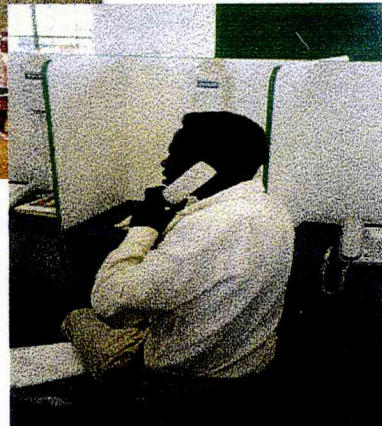


IDRC



Canada



UN ECA



African Information
Society Initiative (AIS)

AFRICAN CONNECTION, AISI, ECA, ACACIA AND THE IDRC

The African Information Society Initiative (AISI) was adopted by African Ministers responsible for Economic and Social Development and Planning at their thirty-first session in Addis Ababa in May 1996, and endorsed the same week by the African Regional Telecommunication Development Conference in Abidjan, and subsequently by the Organisation of African Unity Heads of State (Yaounde) and by the G-7 in Denver.

AISI is an action framework to build Africa's information and communication infrastructure, to be implemented by the United Nations Economic Commission for Africa (ECA) and its partners who work together with African member States in the Partnership for Information and Communication Technologies in Africa (PICTA). Various partners have taken the lead in implementing component areas of the AISI including policy, content development and democratising access to the Information Society. Within the context of the AISI, the African Connection provides a framework for developing Africa's communication infrastructure, to provide the necessary base to expand Africa's electronic connectivity.

Further information on ECA activities can be obtained from:
<http://www.un.org/depts/eca>

The Acacia Initiative is an international effort to empower sub-Saharan African communities with the ability to apply information and communication technologies (ICTs) to their own social and economic development. The initiative is designed as an integrated program of demonstration projects and research and development to address issues of applications, technology, infrastructure, and policy. Acacia is an initiative of the International Development Research Centre (IDRC), a public corporation created by the Parliament of Canada to help researchers and communities in the developing world find solutions to their social, economic and environmental problems. Further information can be obtained from <http://www.idrc.ca/acacia/>

IDRC and ECA have produced the African Overview and the Country Fact Sheets in order to support the African Connection Rally. Committed to working with and disseminating information about the whole continent, IDRC and ECA will also be producing Fact Sheets for the other African countries.

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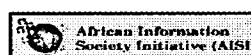


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GLOSSARY

AMPS: American mobile phone system/Advanced mobile phone system

Analog: The storage and transmission of bits of data in electrical wave forms or other representations. This is the opposite of digital where the data is in the form of 0's and 1's.

Backbone: The Internet's high speed data links that serve as major access points to which other networks connect.

Bandwidth: The size or capacity of a communications channel, usually measured in bits per second (bps).

Bit: The smallest unit of information: a 1 or 0. byte. Eight bits define a character (letter or number etc.) There are 256 possible combinations. For example, the bit combination 01010100 stands for capital T, and 00111001 stands for the number 9. For a universal set of keys - Unicode - more bits will be needed to support all the different scripts.

Cellular network: A wireless telephony system that can be used within a certain area. At the centre of each cell (whose diameter may range from one or two kilometres to several dozen), there is a transmitter/receiver with a connection to a cable network. In rural parts of developing countries, fixed cellular networks are used. Use of a telephone is only then possible within a certain cell.

Database: A body of information in digital form. The information may be in many different forms: tables, text, sound, photographs, video film, etc.

Dialup: A connection to a computer made by dialing a computer on a telephone line.

DECT: Digital European Cordless Telephony

Dial-up link: A link using normal telephone lines to dial an Internet service provider or other data service. ISPs issue 'dial-up accounts' to provide this service.

Digital: The storage and transmission of bits of data in the form of 0's and 1's. This is the opposite of analog where the data is in the form of electrical wave forms or other representations.

Domain name: The address that identifies an Internet site. Domain Names consist of at least 2 parts. The part on the left is the name of the company, institution, or other organization. The part on the right identifies the highest subdomain.

End user: The person or organization that will directly use specific hardware, software or services.

Fibre optic: A technology using glass fibre that replaces copper wires for both telephone and computer networks. Uses very rapid light signals (binary) for transmission of data.



Glossary

Gateway: A computer used for exchanging information across incompatible networks that use different protocols. Many commercial services have email gateways for sending messages to Internet addresses.

GSM: Group Systeme Mobile (usually mobile cellular telephony operating in the 900 megahertz frequency band)

IIP: International Internet Project.

Internet: A worldwide network of data communications lines that links computers using the TCP/IP protocol. The Internet now has about 60 million users, 3% of whom are in developing countries.

ISDN: Integrated Services Digital Network - a new dialup standard for high speed data transfer with the capability to also provide voice and other services at the same time. Usually for a total capacity of 128Kbps in each direction.

ISP: Internet service provider - a company that provides any sort of internet service to organisations and individuals. Usually a private sector operator providing Internet access.

kbps: kilobits per second

Leased line: A permanently connected private telephone line between two locations. Leased lines are typically used to connect a moderate-sized local network to an Internet service provider.

Mbps: Megabits per second

Microwave Transmitter: A high mast with a transmitter/receiver. Using a string of microwave transmitters, signals can be transported over long distances.

Multimedia: . Text, sound, and (moving) images in digital form.

Node: A branching or exchange point in a network.

Optical fibre: A light conducting material that allows digital signals to travel at very high speeds. With the right equipment at both ends of an optical fibre wire, a speed of 10 gigabits per second is possible. In practice, a few hundred megabits per wire is more usual. An optical fibre cable consists of a bundle of optical fibre wires.

POP: A point of presence - a computer that is a permanent part of the Internet and accessible by telephone to a computer that is temporarily connected to the network. A modem is necessary at each end of the line.

Protocol: A specification that describes how computers will talk to each other on a network.
pst. Subscribers to newsgroups and mailing-lists take part in discussions by sending, or *posting* their articles or comments online.

PSTN: Public switched telecommunications network.

PTO: Public telecommunications operator.

SDH: Synchronous Digital Hierarchy

Store and forward: The storage of digital files, often e-mail, on a computer, and their transmission to another computer at a later time.

Switched access: A network connection that can be created and destroyed as needed. Dial-in connections are the simplest form of switched connections.

TCP/IP: Transmission Communications Protocol/Internet Protocol are protocols that let different types of computers communicate with each other.

VSAT: Very small aperture terminal. A satellite transmitter/receiver plus a dish antenna measuring 0.5 to 2.5 metres. Communications between a number of PCs, thousands of them if necessary, is possible by connecting them to VSATs and aiming the antennas at the same satellite.

WWW: The World Wide Web.

X.25: Packet switching transmission protocol

AFRICA IN THE GLOBAL INFORMATION SOCIETY

1. Trends and prospects

700 000 Africans are now users of basic Internet services.

This small number represents six times the number of users in all developing countries a mere three years ago. While at that time only 12 countries in Africa had consistent links to the Internet, at the end of 1998 only two (Eritrea and Somalia) did not.

The information revolution is coming to Africa - although its pace is often slow and always uneven. While recent years have seen encouraging trends, the starting point is very low.

The basic measure of progress is teledensity, the number of telephone lines per 100 people: in Liberia and Niger it is .002; in Ethiopia, Burundi and Sudan: .25; in Kenya: .82, Zambia: .94, Zimbabwe: 1.47 and in South Africa: 10.4. The continent has the lowest telephone penetration rates in the world - 50% below the rates of other developing regions.

If South Africa is excluded, just 1 person out of 9000 has access to the Internet compared to a world average of 1 in 38. There is however a significant growth in the number of Internet hosts on the African continent. 2.5% of the world's television sets are in Africa: 3.5 per 100 compared to 24 globally. For radio, the most accessible medium in the region, the figures are 18 per 100 compared to a world average of close to 100.

There are indications, though, that these figures may mask reality. Africa favours sharing of media; newspapers are often read by 10 people, community use of radio and TVs is the norm and shared ICT facilities are emerging in the form of telecentres.

Northern-based statistical concepts might not adequately capture African reality where the population is overwhelmingly rural and activities more community- than home-based. In addition currently available data may not capture rapid changes that have occurred in the last half of the decade. South African 1996 census data indicates that 81,6% of the population can access a phone.

2. Policy, regulation, restructuring, privatisation

African governments are being encouraged to align themselves with global trends

- from public to private ownership
- from monopoly to competition
- from supply to demand driven orientation
- from centralised to distributed command structures
- from local to foreign participation.

Ten countries have partially privatised their national telecommunication operators (including Ghana, Senegal, Uganda and South Africa); 15 are planning to do so shortly (eg Tanzania, Malawi). Others have initiated broad-based information and communication policy reviews (Gabon, Mozambique) while some have gone even further in defining overall national information strategies (Mauritius, Mozambique, South Africa). Twenty countries have established independent or quasi-independent regulators for the telecom sector.

Governments are balancing - within a complex policy environment - the desire to maintain control of the telecom sector to feed their general revenue base and the realisation that liberalisation will improve prospects for investment. Liberalisation models are being adapted to the development

Africa in the Global Information Society

environment in Africa as a number of governments are adopting universal access targets - funded through license obligations - to ensure that marginalised populations can access information society tools.

Broadcasting is also up for review - with efforts to increase plurality sometimes frustrated by lack of advertising appeal in broadcasting to marginalised communities. Concentration on profits in state broadcasting can lead to cancellation of public good broadcasting, for example in Zimbabwe where ZBC has closed its educational station.

3. Infrastructure

...Broadcasting

Radio coverage can reach 60% of the region's population while television is often confined to urban areas except where broadcasters are adopting satellite to extend the reach of their terrestrial systems.

Commercial stations are increasing as a result of liberalisation but news and information is often nationally or internationally based. Local news and current affairs is rare and community radio has been slow to take off, except in a few countries (Ghana, South Africa and Uganda have issued community licenses).

It is still much easier in Africa to learn about events in the North than in the rest of the continent.

...Telecommunications

Main telecommunications lines are increasing 10% annually in sub-Saharan Africa but much of the network is analogue, saturated and unreliable. Overall the sub continent has a fault rate over five times the global average. 50% of lines are concentrated in capital cities. The total number of lines in sub-Saharan Africa is less than the number installed in China in 1997.

Some countries, notably Botswana and Rwanda where 100% of the lines are digital, are expanding and modernising their networks. National efforts are supplemented by regional or subregional initiatives to implement satellite (RASCOM) or digital fibre optic links (East African Cooperation).

Connections within the region are still much more difficult than links with Europe or North America. But in 1996 the proportion of digital lines was 69%, close to the world's average of 79%.

Increasing experimentation with different 'telecentre' and school networking models in the region will exploit the digital network and increase demand. Africa may yet prove its capacity to use the new technologies to leapfrog traditional stages of development.

...Cellular

Unlike the fixed network, expansion of the cellular network has been driven largely by the private sector. 65 operators now provide service in 38 countries. Access is mainly limited to capital cities, some secondary towns and major trunk roads but some cellular providers are implementing innovative approaches to the provision of phone shops and mini-telecentres in rural areas (eg Vodacom in South Africa).

Africa in the Global Information Society

...Internet

In spite of the fast growth of Internet access, use here too is concentrated in major cities far from the dispersed rurally-based population. In Kenya, for example, there are 30 000 users in Nairobi, 1 000 in Mombasa, the next largest city, and 300 each in the three next largest towns. 10 countries have instituted a policy of local call rates for Internet access to facilitate rural access. This enables Internet operators to roll out a network with national coverage and, as usage increases, to locate points of presence in the most cost effective locations.

National telecommunications operators have been quick to establish Internet services along with commercial ISPs. Only in Ethiopia and Mauritius have the PTOs set themselves up as sole suppliers.

Internet in all developing regions was spear headed initially by NGO coalitions providing services to the academic, research and civil society sectors. With these groups still active, and with an increasing awareness in governments and the development sector of the potential of Internet access to improve the effectiveness and efficiency of the delivery of services (health, education, pensions, licensing, government information) there is a chance that the Internet will have a bigger social impact in Africa than in the developed world.

4. Costs

...To service providers

Africa still pays a premium to Europe and North America for its internal communications whether voice or data. Tariffs charged by operators to interconnect within the region discourage voice calls but also inhibit Internet Service Providers from establishing direct links to neighbouring countries or consolidating their international links. There are significant cash outflows to North America and Europe for intra-regional traffic.

Limited and costly bandwidth within the region has prompted many organisations to establish their Websites in Europe or North America which accelerates the outflow of funds.

African PTOs have in the past been beneficiaries of capital inflows as a result of agreements on accounting rates for incoming calls. This source of revenue is however being phased out.

The American Registry for Internet Numbers has taken over the administration of Internet address space for Africa - which implies a payment of US\$2500 annually for African networks.

Increasing Africa's bargaining strength on such issues will be as important as building an effective and affordable regional infrastructure.

...To users

The average cost in Africa of renting a telephone is 20% of the 1995 GDP per capita - as compared to global average of 9% (1% in high income countries). In spite of the fact that many people cannot afford their own phone there are still relatively few public phones: 1 for every 17000 compared to a world average of 1 to 600.

Costs of phone installation, line rental and calls varies widely in the region - as much as a factor of more than 10 in the case of local calls. Local call tariffs of up to \$20 an hour inhibit Web use severely in some countries.

Africa in the Global Information Society

Computer and related equipment costs are generally high in the region as a result of tax regimes which treat them as luxury goods rather than as crucial elements of economic growth. This too has an inhibiting effect on growth of Internet use.

5. Private sector role

The amount required to achieve a teledensity of 1 line per 100 inhabitants has been estimated (for sub-Saharan Africa excluding South Africa) at \$6 - 8 billion. While governments clearly have an important role to play in creating an environment to attract investment, most of the capital will have to come from the private sector. A number of private sector initiatives have responded to the challenge of linking Africa into the global information society.

The Global Information Industry Commission has supported dialogue and workshops on national information infrastructure planning processes and the importance of private sector investment. In 1998 it established an Africa arm but its work is likely to continue to focus on advocacy rather than on operations.

A number of satellite systems (Iridium, Panamsat, Inmarsat, WorldSpace) will extend infrastructure significantly within Africa. The extent to which they lead to increased use of communications facilities by rural populations will be largely determined by the cost, ruggedness and interactive capabilities of the equipment needed to link to them.

Increased satellite capacity is being accompanied by investment in fibre optic cable to link Africa more effectively with other regions (apart from AT&T's Africa One, the South Africa-Far East project of SA Telkom is an example).

The multi-national private sector does appear to have realised that Africa is the last big telecommunications market. The challenge is to reach beyond the urban markets to the bigger - but less accessible - rural populations.

6. Programmes of development agencies

It is precisely these less accessible areas - where poverty is most severe - that have been the focus of activities initiated by the development community.

Since the Information Society and Development (ISAD) Conference in 1996 there has been an exponential increase in interest in exploring the potential of ICTs to empower communities to break out of cycles of poverty. There are over seventy donor programmes active in the region in support of projects that include, inter alia, telecentre implementation, applications and content in all development sectors and human resources development.

The role of development agencies in the area of ICTs is essentially experimental: to test the power of the new technologies to remove development blockages, to disseminate results and to encourage replication. In a sense the development agencies are priming the pump for private sector investors and there are many opportunities for collaborative programmes to maximise the investment of both sectors.

A number of development agencies have been working together as part of the African Information Society Initiative (AISI). AISI is an action framework to build Africa's information and communication infrastructure which was adopted in May 1996 by the Economic Commission for Africa (ECA) Conference of Ministers and has been endorsed by the Organization of African Unity Heads of State

Africa in the Global Information Society

(Yaounde) and by the G-7 in Denver. It is to be implemented by the ECA and its partners who work together with the African member states in the Partnership for Information and Communication Technologies in Africa (PICTA). Various partners have taken the lead in implementing areas of the AISI including policy, content development and democratising access to the information society.

7. Applications: the use of ICTs

...Telecentres

The concept of a telecentre has been seen by many to be the way to include rural communities in the information society. A telecentre unites people living in poor communities with the technologies that enable them to communicate, access information, and exchange ideas with close neighbours and potential partners all over the world. At one end of the spectrum the telecentre may be a simple phone shop - at the other a community centre equipped with phone, fax, copiers, computers and Internet access. Telecentres may also be located in schools or clinics and become members of education or health networks. There are many telecentre models but there is consensus that access to the Internet is the goal which offers the most benefit.

Telecentres may be owned by entrepreneurs (either individually or as part of a franchise) or by community organisations. In the latter case they are often subsidized (by donors or by governments indirectly through universal service obligations generated by the telcom sector). Private sector opportunities abound for developing new infrastructure, technologies and tools adapted to community use. These include the design of secure physical facilities, new approaches to delivering the communications infrastructure, hardware, software and content. At the moment donors and governments are taking the lead in what is in effect an attempt to prime emerging markets for the private sector.

Many experimental telecentre programs are underway in Africa. In South Africa the main actor is the Universal Service Agency which is currently developing a number of private and public sector models. On the donor side, IDRC, UNDP, UNESCO, ITU and the World Bank are all funding pilot centres in Egypt, Tanzania, Mali, Benin, Mozambique and South Africa, to cite just a few examples.

...Governance

Using ICTs for promotion of good governance involves more than simply open access to government information on the Internet. It involves an interaction between the different sectors of society and a forum for an exchange of information and views. Areas of governance activities include the delivery of government information; networking and sharing information; provision of legal and licencing information; delivery of government services; human rights; election management/monitoring; and freedom of information.

At the moment, there are very few African governments on-line in any form. While some sites call themselves the "official" site of the country they are usually run by private individuals or institutions. However, there are several initiatives underway in the area of governance. For instance, one of the G-7 pilot projects is "Government On-Line" and the United Nations System-wide Special Initiative on Africa has a "Strengthening the Capacity of Governance" theme which includes peacebuilding; increasing governments' capacities for transparent, responsible and effective governance; and strengthening civil society.

The plan of the South African Department of Communications to develop an infrastructure of Public Information Terminals (PIT) provides an example of the use of ICT in development. These terminals

Africa in the Global Information Society

will provide public access to the Internet, government information and e-mail facilities. The first prototypes were installed at post offices in and around Pretoria.

...Health

For many years different electronic technologies have been used to communicate between the health sectors in Africa and in the rest of the world. One of the most significant initiatives is HealthNet which has been implemented in 20 African countries. This is a project of SatelLife which is a non-profit organization of scientists and medical researchers. HealthNet was conceived as a means of combatting the isolation of health workers in developing countries and the lack of information that impedes their work. The average medical library in the US would have 3,000 medical journals in its collection; many in Africa have 30. The network provides email, electronic medical publications, and access to medical databases and conferences.

However, there are many other initiatives such as: the Association for Health Information and Libraries in Africa Network (Ahila-Net) which is run from the World Health Organization in Geneva; the National Progressive Primary Health Care Network (NPPHCN) which is an advocacy organization in South Africa; the Sister Library Programme which twins the University of Zambia Medical Library and the University of Florida Health Science Library; and Droits et sante pour les femmes d'Afrique Francophone which uses ICT to strengthen communication and coordination between women in Francophone countries on the issues of health and women's rights; and the Mapping Malaria Risk in Africa (MARA) project implemented by the South African Medical Research Council.

...Education

ICTs are considered by many to have tremendous potential for enhancing the educational process. It is felt that they can enhance both effectiveness in classroom activities and efficiency in administration. ICT can be used in teaching and learning, for instance, to increase accuracy and enhance the presentation of work; to provide students with interactive educational tools; to develop and improve distance education methods and content; to provide access to information and other resources; and to provide links to others. There are a wide range of initiatives related to ICT in education that are currently being undertaken by international development agencies, local organizations, governments and educational institutions.

One example of an educational ICT initiative is the development of school networks within Africa. SchoolNet SA for instance was established in 1997 and is a national organization in South Africa that seeks to support educators and transform education through providing resources, expertise, co-ordination and effective partnerships in the areas of Internet Connectivity and appropriate technology; the development of online content and teaching and learning resources; human resource development and capacity building; and advocacy and marketing. Another initiative is the World Links for Development (WorLD) programme which is a pilot educational project that forms part of the World Bank initiative to fund the implementation of ICT in schools in developing countries. It is providing support for the linking of 1,200 public schools in developing countries to the Internet. In Africa it is providing support in Ghana, Mauritania, Mozambique, Senegal, South Africa, Uganda and Zimbabwe.

Africa in the Global Information Society

...Business support

In South Africa, the IT industry has been growing rapidly which is largely attributable to the demand for ICT-based services outsourcing (e.g. services relating to ISP, Intranet, web design and hosting, information systems) by the medium and large corporate sector. The South African Small and Micro-Enterprise (SME) sector has extremely limited access to services offered by the IT industry. Outside of South Africa, the IT industry and ICT-based services are comparatively poorly developed. With few exceptions, the comparatively small size of markets in African countries limits the commercial attractiveness of greenfield IT investments. An important emerging IT growth area for Africa is electronic commerce. Globally, trade in electronic commerce is expected to exceed \$1 trillion by 2002.

International donors and the public sector are becoming increasingly involved in promoting the use of ICTs in the SME sector. These include the IDRC, the World Bank, the United Nations Conference for Electronic Trading and Information Technology (UNCTAD), the International Trade Centre (ITC) and the United Nations Development Program (UNDP). Examples are the Trade Point projects, the Virtual Trade Fair Project and a database of support institutions of SMMEs in Southern Africa.

The Trade Point programme of UNCTAD, for example, is designed to support and foster efforts made in many sectors (government, enterprise) to stimulate the trade competitiveness and trade efficiency of national economies. At Trade Points, public and private sector cooperate to improve efficiency in customs, banking and insurance, transport, business information, business practices and telecommunications. In addition, business support activities of the IDRC include a project which provides ICT support for self-employed women and women involved in running small businesses in Southern Africa; a Rural Business Information Network Pilot Project aimed to design, develop, pilot test and assess the use of ICTs in selected Local Business Service Centres in South Africa to address the challenges of SME development in the tourism sector; and a regional small business development network for which the SACatalyst website has been developed. This website is designed to promote small business development in Southern Africa using the Internet as the primary communications medium.

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The area of information and communications technology is rapidly changing. These fact sheets represent, at best, a picture of a moving object. They are not intended to represent an IDRC or an ECA position on the issues addressed. IDRC and ECA would welcome any additions, corrections and suggestions.

TUNISIA

The public telecommunications operator is Office national des télécommunications (ONT), also called Tunisia Telecom.

- Tunisia has a well developed telephone network and well established Internet service.
- There is a gradual restructuring of Tunisia Telecom to create room for new services and networks under an independent regulator.

Background

Tunisia is the smallest of the Northern African countries. Once primarily reliant upon agriculture, oil and phosphates, the Tunisia economy has become fairly diverse and now has significant industrial and tourism sectors. The economy is dominated by the service sector which includes tourism. In recent years Tunisian exports have risen faster than imports owing to a surge in the export of industrial goods. Most of the trade is with Western Europe. Since 1986 the economy has been transformed to one based upon free market principles. The government is continuing to institute reform and privatisation.

Capital: Tunis
Population: 9 million (1995)
GNP: \$16,600 million (1998)
GNP/capital: \$1,860 (1995)
GDP (average annual growth rate): 1.2% (1980-93)
Foreign debt: \$9,938 million (1995); 61% of GNP
Development aid: \$69 million (1995); 0.4% of GNP
Currency: \$1=1.15 Tunisia Dinar (March 1999)

Sector Overview and Statistics

Tunisia has a well developed telephone network and well established Internet service operated by the national research institute. Tunisia is connected to a number of marine fibre optic telecom backbones, including a dedicated cable to Italy, the SEA-ME-WE and TAT networks. Due to its proximity to Europe and other Arabic countries it is able to make use of Eutelsat and Arabsat, as well as Intelsat for satellite communications. Terrestrial cable links connect Tunisia to Algeria, Libya and Morocco. An international ISDN link with Germany is in place and Tunipac provides X.25 data services for 1,500 customers. The cellular operator is Tunicell which uses GSM (1995) and NMT 450 (1985). The GSM has 30,000 subscribers and covers Tunis. The NMT has 8,000 subscribers and covers 60% of the country.

Tunisia Telecom has been expanding the telecom network in the rural eastern half of the country and has been upgrading existing switches and exchanges. It aims to increase telephone density to around 14 percent by the end of the decade. Tunisia's domestic transmission network presently makes extensive use of microwave radio links, and also uses microwave links to communicate with its immediate neighbours, Algeria and Libya. Nationwide frame-relay and ATM services are being planned.

Some Statistics:

Telephone lines: Total capacity - 875,000; Total connected - 575,000 (1996).
Digitalization of switched network: 83%
Digitalization of transmission network: 85%
Cellular phones (1998): Total capacity - 45,000; Total connected - 38,000
Public telephones: 5,500 (Publitels - run privately)
Internet subscribers: 1,500

Internet:

A new organisation, the Agence Tunisienne Internet (ATI), was recently set up to manage Internet services in the country as part of its mandate to catalyse Tunisia's "Information Society". Established



Tunisia

in 1996, ATI took over operation of Tunisia's national Internet backbone and the top-level domain (TLD) from the Institut de Recherche Scientifique en Informatique et Télécommunication (IRSIT). In 1998, the government announced that up to 80% of IRSIT would be open for purchase by the private sector.

ATI operates POPs in seven towns across the country and provides International connectivity via Sprint to the US and Telecom Italia. ATI does not provide access to the end-user but provides access to the various suppliers who perform this function. Seven organisations manage Internet access for various public sectors:

- Agence Tunisienne Internet (ATI) for public institutions
- Institut de Recherche Scientifique en Informatique et Télécommunication (IRSIT) for research centres
- Centre de Calcul Khwarezmi (CCK) for universities
- Institut National du Bureautique et Micro Informatique (INBMI) for secondary and primary schools (EDUNET)
- Centre Informatique du Ministère de la Santé Public (CIMSP) for health establishments
- Institution de la Recherche et de l'Enseignement Supérieurs Agricoles (IRESA) for agricultural institutions
- Tunisia Telecom for telecommunication agencies

There are two ISPs providing private sector and personal access: Planet Tunisie and 3S Global Net (Standard Sharing Software).

Internet access is available across the whole country via a local call. There were an estimated 5,500 users in mid 1998. The majority if not all research centers, education institutions, health institutions, governmental institutions and ministries and private companies are connected to the Internet.

Projects:

- Introduction of intelligent networks, extension of transmission network and introduction of 64kpbs data lines.
- Alcatel has a GSM infrastructure project with Tunisia Telecom worth \$20 million. The network will serve Bizerte in the North to Djerba in the south and will serve 35,000 subscribers by 1998 and 100,000 when it reaches capacity.

Policy and Regulation

The telecommunications sector is regulated by the Ministry of Communication. Reform in telecommunications is a key government consideration and the government aims at supporting private initiatives and enhancing investment and enterprise in general. Part of the commercialisation policy is diversification of access network technologies to include GSM, DECT and rural telephony. To this end, the gradual restructuring of Tunisia Telecom is taking place to create room for new services and networks under an independent regulator. The process of functional separation of operational and regulatory activities began with the 1997-2001 plan. It involves structural adjustment and separation of responsibilities into Tunisia Telecom as the public network operator and CERT (Telecommunications Study and Research Centre) as the regulator.

Telecom investment in the current 5 year plan (1997-2001) is expected to be \$1.5 billion which is 4% of the national gross domestic fixed investment. This will be directed to the following areas:

- Extension and modernisation of national network.
- Promotion of international telecommunications to unlock the national economy.
- Development of new services and promotion of value added services.
- Initiation of the demarcation of regulatory and network operations through restructuring and adjustment of the institutional environment.

- Development and promotion of partnerships in international telecommunications through technology transfer; implementing productivity standards and stimulating exchanges.
- Exploring participation in the Africa One and TransMaghreb cable projects with a view to turning Tunisia into a hub and platform for regional and international telecommunication.

Communications Costs

The cost of Internet access is 30 Dinars per month (unlimited access), plus 40 Dinars for software and installation.

Applications

- A national commission for electronic commerce and EDI was created in November 1997 to plan the infrastructure for electronic commerce in Tunisia which should be operational by the end of 1998. Its workgroups are studying different aspects of electronic commerce (legal, financial, security etc). During a conference held in March 1998, recommendations were submitted to the government and two pilot projects were defined.
- IRSIT has a long history of ICT involvement and established Réseau National pour la Recherche et la Technologie (RNRT) in 1993 which connects 22 research institutions in Tunisia. RNRT is being developed in conjunction with the Secrétariat d'État à la Recherche Scientifique et la Technologie (SERST). IRSIT is also the national focal point for the regional arab network RAITNET assisted by the Centre de la Ligue arabe.
- Education:
 - The Centre de Calcul Khwarezmi, Campus Universitaire Tunis, is responsible for the universities network - the Réseau national Universitaire (RNU) which connects 53 higher academic institutions.
 - INBMI's Education Network EDUNET has connected 136 secondary and primary schools and aims to connect a further 320 secondary schools and 500 primary schools in 1999.
 - Each university has a Bibliothèque Universitaire Centrale (BUC) which is responsible for all local documentary activities and is part of a national electronic network of BUCs in the country.
- CIMSP's Health Network RNS (Réseau National de Santé) is connecting 20 health centres from different regions of Tunisia.
- Centre de Documentation Nationale (CDN) is the IIP focal point for the UN Education, Science and Culture Organization (UNESCO). It has developed a guide to information services in Tunisia and a number of databases including ITARAT on government, and ASSO on associations. CDN has also developed biographic data on informatics professionals. In addition, CDN is the sub-regional focal point for La Francophonie's BIEF programme and is developing a database server covering Djibouti, Égypt, Lebanon, Morocco, Mauritania and Tunisia with 25 local partners and the focal points in the 5 other countries.
- There are 12 Centres Nationaux Pilotes Sectoriels (CNPS). Each of these national pilot centres will build sectoral networks. Sectors include agriculture, youth, women and cultural development.

Donor Programs

European Community: Has a capacity development programme called Decision Support System for Coastal Management. This programme assists the countries surrounding the Mediterranean in using remote sensing data, GIS systems and Multi-Criteria Aid Techniques (MAD) for coastal management and pollution abatement.

IDRC: The Centre national de l'informatique (CNI) has established a bilingual (arabic-french) email system with assistance from the International Development Research Centre (IDRC).

Tunisia

UNDP: The Ministry of Environment is being assisted to improve access to environmental and sustainable development information by the Sustainable Development Networking Programme (SDNP) of the UN Development Programme (UNDP).

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LIBYA

The public telecommunications operator is the General Posts and Telecommunications Company (GPTC).

- There is limited information available about ICTs in Libya and UN sanctions restrict the development of international assistance programmes in the country.
- GPTC is the national operator and regulator for all telecommunications services and there is no privatisation planned.

Background

Libya has one of the lowest population densities in the world but population growth is high. About 90% of the population is concentrated in and around the coastal cities. The economy is dominated by oil which contributes some 90% of Libya's export earnings and approximately 30% of GDP. The economy is largely controlled by the state, which nationalised most productive sectors in the 1970s. Economic policy has increasingly focused on mitigating the impact of UN and US sanctions. A non-party electoral system has been in force since 1977. United Nations sanctions were imposed on Libya in 1992. These sanctions were tightened in 1993 and 1996, when the US passed into law secondary sanctions aimed at punishing non-US firms which were then investing more than \$140 million a year in the Libyan oil industry. Since then the sanctions have hurt the domestic economy, driving up import costs and inflation.

Capital: Tripoli
Population: 5.4 million (1995)
GNP: US\$23,333million (1998)
GNP/capital: US\$5,310 (1989)
GDP: n/a
Foreign debt: n/a
Development aid: US\$7 million (1995)
Currency: \$1=0.42 Libya Dinar (March 1999)

Sector Overview and Statistics

- The cellular network was launched at the end of 1997.
- A \$42.5 million contract was signed between Ericsson and Orbit Telecom for a GSM network for the coastal zone.
- The Centre National de l'Information et de la Documentation (NIDA) is the main networking agency in the country and it is in the process of establishing Internet connectivity. Currently its web site is hosted in the UK.

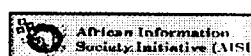
Some Statistics:

Telephone lines (1995 estimate): Total capacity - 400,000, total connected - 370,000, lines per 100 people - 5.88

Digitalisation of switched network (1993 estimate): 15%

Average waiting time for telephone line installation (1995 estimate): 11 years

Public telephones (1995): 450



Libya

Policy and Regulation

There is no known government policy for the development of the telecommunication sector. GPTC is the national operator and regulator for all telecommunication services. There is no privatisation planned. The GPTC monopoly includes GSM cellular/mobile services which are provided through a wholly-owned GPTC subsidiary, El Madar Telephone Company (Orbit Company), under an unlimited license covering the coastal zone, Zuwanrah, Tripoli, and Al Uarabutti.

Communication Costs

PSTN: Connection charge - \$127; rental per month - \$5

Donor

UN sanctions restrict the development of international assistance programmes in Libya.

European Community: The European Community has a capacity development programme called Decision Support System for Coastal Management. This programme assists the countries surrounding the Mediterranean in using remote sensing data, GIS systems and Multi-Criteria Aid Techniques (MAD) for coastal management and pollution abatement.

Key Contacts

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EGYPT

Egypt Telecom is the public telecommunications operator.

- There have been major improvements to the telecommunications network recently and lines are relatively easy to obtain. The government intends to expand and upgrade service and access.
- Egypt Telecom has been undergoing a series of institutional reforms and the government has announced that it will be gradually privatised.
- Internet services are widely available and the users are almost equally distributed in the academic, governmental and commercial sectors.

Background

After South Africa, Egypt possesses the most sophisticated and diversified economy on the African continent. The mainstays of the economy are tourism and the Suez canal. After becoming the most indebted country in the Middle East and Africa during the late 1980s, Egypt set about an economic reform programme in collaboration with the IMF. This included, amongst other measures, the privatisation of Egypt's huge, inefficient and uncompetitive public sector industries. However, the pace of privatisation has been slow. Despite liberalisation, the government sector still plays a dominant role in the economy, employing about 35% of the total labour force.

Virtually the entire population is concentrated in the Nile Delta and along the river valley which accounts for about 4% of the land area. The capital, Cairo is home to approximately 15 million and is the largest urban agglomeration in Africa. Egypt has had a multiparty system since 1977 following many years of authoritarian rule. Hosni Mubarak of the National Democratic Party has been president since 1981.

Capital: Cairo
Population: 57.5 million (1995)
GNP: \$45,500 million (1998)
GNP/capital: \$790 (1995)
GDP (average annual growth rate): 1.3% (1990-95)
Foreign debt: \$34,116 million (1995); 75% of GNP
Development aid: \$2,017 million (1995); 5% of GNP
Currency: \$1=3.33 Egyptian pounds (March 1999)

Service Overview and Statistics

There have been major improvements to the telecommunications network recently and lines are relatively easy to obtain. Two licences are being finalized for public telephone networks. They are Menatel (France Telecom, National Bank of Egypt, local investors) and Nile Telcom (Misr Bank, Landis & Gyr, local investors). In both cases, no shares are owned by Egypt Telecom and both operators are committed to installing 20,000 public telephones during the first five years of operation. The government wants to increase telephone lines by 18% over the next five years. A private rural service is being introduced in addition to GSM services. The government wants to add 500,000 lines backed by \$200 million in phased grants from the US Agency for International Development (USAID). Phase One, which is underway, extends switching systems by 101,000 lines. There are an additional 92,000 lines for Cairo and Alexandria. Also planned is a central switching system and a network operation centre.

Egyptian Radio and Television Union of the Ministry of Information has launched its first satellite for broadcast services, the Nilesat. NileSat covers North Africa, the Gulf states and Southern Europe. Egypt Telecom set up the country's first mobile telephone network in 1996 with the French firm Alcatel. For international communications, Egypt currently uses a combination of microwave, satellite, and submarine fiber optic links. Egypt is a member of ARABSAT, INTELSAT, and INMARSAT and is connected to the SEA-ME-WE2 submarine fiber optic system. Egypt also participates in the FLAG submarine fiber optic project, and is home to landing sites in Alexandria and Suez.



Egypt

Service	Availability	Operator	Comments
Telegraph	Nationwide	Egypt Telecom	
Telex	Nationwide	Egypt Telecom	
PSTN	Nationwide	Egypt Telecom	In 1998, total capacity: 4,800,000 Total connected: 3,650,000 Lines per 100 people: 6.12 Waiting list: 1,275,000 Digitalisation: 75%
Cellular		Mobinil	Consortium of Motorola, France Telecom, and Orascom which is currently operating the existing GSM network that supports over 140,000 subscribers.
		Misrfone	International consortium that includes Vodafone, Airtouch, Alkan and EFG-Hermes.
		Egypt Telecom	An analogue TAC service with 7,000 subscribers.
ISDN		Egypt Telecom	
Internet	Nodes in 13 cities	35 ISPs	
X.25 packet switching	Nodes in 11 cities	Egypt Telecom (called Egyptnet)	1,687 accounts. Planning on upgrading their network to offer a frame relay service.
Private VSAT networking	Nationwide	Egypt Telecom	Two hub earth stations are installed at the Maadi teleport of Egypt Telecom. Multinationals have started to install VSAT terminals with the consent of Egypt Telecom. About 35 private VSAT terminals were installed by the end of 1997.

Internet:

Internet services are widely available in Egypt and businesses are hooking up in the thousands to access international trade. The market for Internet service provision can be divided into three main groups: academic, governmental, and commercial/private users. The government's Cabinet Information and Decision Support Centre (IDSC) is responsible for government users, the Egyptian Universities Network (EUN) is responsible for the academic and research network and the Regional Information Technology and Software Engineering Centre (RITSEC) is providing access for the private sector. The community of Internet providers in Egypt has established the Internet Society of Egypt (ISE) which is an NGO umbrella that has all major players of the Internet in the country.

The RITSEC was established in 1992 through multilateral donor funding and is hosted by the IDSC. In 1994 the IDSC, in cooperation with RITSEC, started a plan to disseminate the Internet in Egypt. The government funded the project as part of its efforts to open the country to the rest of the world and increase the cultural exposure of the Egyptian society. IDSC/RITSEC offered free Internet access for corporations, governmental agencies, non-governmental organizations and professionals. The number of Internet users in Egypt grew to 10,000 by late 1995.

In 1996, the government, represented by IDSC/RITSEC and Egypt Telecom, started an initiative to develop a reasonably priced Internet backbone and gateway facility for private-sector ISPs. By March of the same year, IDSC/RITSEC licensed 12 ISPs to provide the services for the private sector and individuals, continuing to provide the service to governmental organizations free of charge. IDSC/RITSEC took the Internet points of presence (PoPs) beyond the capital and to major cities in

Egypt. Between early 1997 to mid 1998, the number of Internet users in Egypt increased from around 25,000 to around 100,000; the number of ISPs increased from 16 operational ISPs to around 40; and the number of cities where users can access Internet at local call rates increased from 4 to 11. There are currently over 50 ISPs in Egypt, mostly using a collective international gateway of one 2 Mbps and 1 Mbps circuit. This is operated by RITSEC on Global One and MCI circuits through Egypt Telecom. IDSC/RITSEC is also peering with the EUN to exchange local traffic. IDSC/RITSEC is trying to establish an Internet exchange for the Egyptian service providers to save on the international bandwidth and provide better services for Egyptian users at large. Thus, around 70 percent of the Internet traffic between Egypt and the world passes through the network of the IDSC/RITSEC.

Domestically, IDSC/RITSEC has installed digital multiplexers in the public switches to establish the first digital access network in Egypt. The network is managed by Egypt Telecom and provides a high-speed distribution network for more than 50 nodes in Egypt with speeds up to full E1. Currently, Frame Relay switches are being installed by Egypt Telecom and IDSC/RITSEC started offering Internet access over Frame Relay. Absence of telecommunications infrastructure has been an obstacle for Internet access in rural areas. IDSC/RITSEC is currently using a pilot network of VSATs to connect 6 information centres in rural governorates in upper Egypt to the Internet. The VSAT network is using hubless technology to provide access speeds of over 64 Kbps for each site over a shared media.

In September 1998 Egypt Telecom made an agreement with Digitcom of California to establish an Internet voice telephony service between the US and Egypt. The market is currently estimated at over 100 million minutes a year between the two countries. Egypt Telecom will be able to cut its operating costs and become more familiar with the technology, but is unlikely to make the service available for resale to ISPs in the short term - much of its revenues come from international traffic and this is used to cross-subsidise local service.

Projects:

- The Mega Project is an integrated project for expansion and upgrading of switching, transmission and access. The five year project has the following four components:
 - Nine Vision: expansion and upgrade exchanges capacity, upgrade transmission in the Delta. Main supplier is Alcatel. Budget \$45 million.
 - Egypt 2000: upgrade transit exchanges and interconnecting them using SDH. Main supplier is Siemens (EGTI). Value of first tranche \$24 million, second tranche \$24 million.
 - Golden Pyramid: expansion and upgrade of exchange capacity, DECT wireless local loop. Main supplier is Lucent. Value \$315 million.
 - Microwave transmission and switching: Main supplier NEC. Value of first tranche \$24 million; second tranche \$24 million.
- Equipment for international PSTN, radio paging and Internet & X.25 will be upgraded under a \$16 million programme.

Policy and Regulation

The public telecommunications operator converted from a government department to corporation when ARENTO (Arab Republic of Egypt Telecommunication Organization) was incorporated in 1980. ARENTO changed its name to Egypt Telecom in 1997 and has a board of 11 which is appointed by the government. Egypt Telecom is wholly-owned by the government and is under the day-to-day supervision of the Ministry of Transport and Telecommunications. Egypt Telecom has procurement autonomy. However, international loans and grants are accepted by the government and passed on to Egypt Telecom, sometimes with an interest mark-up. Egypt Telecom pays 42% corporate income tax on profits and there are no subsidies received or paid. The government has also announced that Egypt Telecom will be gradually privatised. The new Telecommunications Regulatory Board (TRB)

Egypt

was formally established in 1996.

Providing licenses for value added services and services targeting niche markets are becoming increasingly acceptable as the core perception for Egypt Telecom as a basic services provider crystallises. Egypt Telecom was given exclusive concession to provide basic national and international telecommunication service and infrastructure, with an exception for private VSAT networking. Egypt Telecom also has a manufacturing arm, the Egyptian Telephone Company (ETC), which has entered into joint venture agreements with Siemens, Alcatel, and Ericsson for the manufacture and assembly of digital switches, PBX's, and telephone sets. In addition, limited competition has been allowed in the mobile telephone industry since 1997. An offer of a 30% stake in the state-run Egyptian Mobile Phone Service Company was more than 50 times oversubscribed. The National Bank of Egypt stated that the offer had closed after 10 days because of the intense demand for the 18 million shares being sold.

Communications Costs

PSTN: Connection charge - \$260; rental per month - \$1.50

Local Calls cost \$1.80/hour.

Mobile Calls cost \$8/hour.

Applications

IDSC/RITSEC: In order to develop Egyptian content on the Internet, IDSC began implementing the Egyptian Information Highway Project in late 1995. It seeks to accelerate social and economic growth in Egypt by promoting and supporting electronic dissemination of information over communication networks. Within this project, several pilot information networks are being launched: TourismNet, CultureNet, HealthNet, EnvironmentNet, GovernoratesNet, LibrariesNet and Government Online. IDSC/RITSEC is also developing a regional telemedicine network to provide telediagnostic, database access and multimedia facilities for doctors in the Arab region. On a sub-regional level, RITSEC was instrumental in founding the Regional Arab Information Technology Network (RAITNET), a non-governmental regional network of institutions to facilitate co-ordination and training among those active in building ICT infrastructure in the Arab region. There are about 50 member organizations of RAITNET.

Education:

- The Egyptian Universities Network (EUN), located in the Supreme Council of Universities (SCU), has connected a large community of Egyptian universities.
- The Academy of Scientific Research and Technology (ASRT) is responsible for the scientific and research electronic networking in Egypt and has established the Egyptian National Scientific and Technical Information Network (ENSTINET) for this purpose.
- The Ministry of Education (MOE) has an extensive programme involving ICTs in education. Recently it has launched the Mubarak National Project which includes a number of activities using ICTs in secondary schools. The project will initially be piloted in 150 secondary schools. Three MOE agencies will be supporting the ICT aspects of the programme: The Technological Development Center (TDC); the Video, Audio and Photography center which produces a variety of technology-based educational programmes; and Central Production which is producing multimedia programmes..

The Centre for Social Research is establishing the Regional Information Network for Arab Women (RINAW).

Donors

Andre W. Mellon Foundation: This foundation is facilitating the use of Internet tools by selected scientists.

European Community: The European Community has a capacity development programme called Decision Support System for Coastal Management. This programme assists the countries surrounding the Mediterranean in using remote sensing data, GIS systems and Multi-Criteria Aid Techniques (MAD) for coastal management and pollution abatement.

USAID: A series of US Agency for International Development (USAID) investments in Egypt's telecommunications sector is supporting the institutional strengthening of Egypt Telecom and the improvement and expansion of telecommunications networks in Cairo and Alexandria. USAID has completed five telecommunications projects valued at \$500 million. Egypt Telecom has made changes in finance, accounting, payroll, personnel, planning and management systems.

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SUDAN

The public telecommunications operator is Sudan Telecommunications Public Company Limited (Sudatel).

- The government has taken a number of measures to deregulate the telecommunications sector and telecommunications services have been fully privatised.
- There is a lack of reliable telecommunication infrastructure across a large country.

Background

Sudan's territory is the largest in Africa and is divided into a Muslim north (and centre) and a non-Muslim south. The southerners' armed rebellion against the Muslim rulers in Khartoum has been the most enduring in Africa, having disrupted the country for more than 40 years. Sudan became an independent multiparty state, but this has been interrupted by long periods of military rule. Most of the people live in central Sudan and along the Nile and its tributaries. Cotton is by far the most important export product.

Capital: Khartoum
Population: 29 million (1995)
GNP: \$10,367 million (1998)
GNP/capital: \$360 (1995)
GDP (average annual growth rate): 4.6% (1991-95)
Foreign debt: \$18,500 million (1995); 183% of GNP
Development aid: \$225 million (1995); 2.2% of GNP
Currency: \$1=213.18 Sudan Dinar (March 1999)

Sector Overview and Statistics

The government has taken various measures to deregulate the telecommunication sector and private sector fixed wireless telephone services do exist. Full Internet services are provided by a single ISP (SudaNet) which is 35% owned by Sudatel. The Internet service uses a VSAT system linking to the US via NSN. The cellular operator is Mobitel (1997) whose shareholders are Sudatel (40%) and local investors (60%). The Mobitel main switch is co-sited at the Sudatel central exchange, using optical fibre links to base transceiver stations (BTS), with a 2 Mbps Sudatel line for international traffic. Its coverage is greater Khartoum (approximately 400 km²). Public phones are now being installed. Plans for digitizing existing analog lines and replacing older unreliable switches with modern high speed switches are underway. Fiber optic links to various regions and within Khartoum have been established.

Some Statistics:

Telephone lines (1998):

Total capacity: 150,000

Total connected: 110,000

Lines per 100 people: 0.6 and plan to reach 1.0 in 1998 and 3.0 in 1999

Digitalization of switched network (1998): 58%

Cellular phones (1998):

Total capacity: 20,000 (Mobitel)

Total connected: 3,000

Internet: Sudanet has 600 subscribers

Projects:

- Sudosat (domestic satellite network) expansion to link 36 towns.
- Expansion of optical fibre link to Port Sudan from Atabra and to El Damzin from Medani.
- \$3 million from Alcatel to upgrade international exchange ITC2 and Arabsat earth station.
- \$15 million from Siemens for expanding local exchanges and new lines.



Sudan

Policy and Regulation

The Sudan Telecommunications Public Corporation (STPC) was formed in 1942 and in 1994 it was divided into a private telecom company (Sudatel) and a regulatory body (National Telecommunication Council - NTC). NTC is responsible for regulating the telecommunications sector and falls under the Ministry of Roads and Communications. In 1992, the Economic Salvation Programme started to open the door to private investors. Telecommunications was one of the focus areas and both the telecommunications and postal services have been fully privatised.

The local telecommunications field is open although Sudatel is currently the only player. Sudatel is owned privately, with a 20% government share. It has a board of directors representing the major stakeholders (Hi Tech Group, Nile Water Limited, government, Sudan Real Estate bank, Abnaa Investment Corp, Dan Fodio, Anees Hagggar, Hashim Hago Ibrahim). For 15 years, with effect from October 1994, Sudatel must provide the national backbone and domestic and international basic services.

Communications Costs

PSTN: Connection charge - \$60; rental per month - \$24; 3 minute local call - \$0.25.

Sudatel Dialup Internet: Embassies, NGOs and businesses pay \$500 to subscribe and \$100 in monthly service fees. Government ministries and universities pay \$345 and \$145 respectively to sign up, then \$45 per month. Individual subscribers pay \$200 to subscribe with monthly service charges of \$40.

Donors

IDRC: The University of Gezira established an email service at the Faculty of Medicine in 1996 with support from an International Development Research Center (IDRC) project which linked the university with the Centre for International Health (CIH) at McMaster University in Canada. The system connects twice a day with the GreenNet Internet gateway in London. The system is available to the university faculties and NGOs such as WHO, Agricultural Research Corporation (ARC), Omdurman Childrens' Hospital, Wad Medani Teaching Hospital and the Sudanese National Aids Programme (SNAP).

COMESA: The Common Market for Eastern and Southern Africa (COMESA) is managing the UNCTAD developed system called Automated System for Customs Data and Management (ASYCUDA).

Satellife: There is an operational HealthNet node in Kenya. This is a support network providing email connections for health workers and researchers in developing countries.

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The International Development Research Centre (IDRC) and the United Nations Economic Commission for Africa (ECA).

ETHIOPIA

The public telecommunications operator is the Ethiopian Telecommunication Corporation (ETC).

- Ethiopia has a relatively reliable telephone network but it is very difficult to get new lines and there is a large rural population requiring access.
- The telecommunication sector is opening up although at this point ETC maintains a monopoly.
- There is a high cost of access to the public Internet service.

Background

Ethiopia is one of Africa's larger countries and its population is exceeded only by Nigeria and Egypt. Its limited resource base, rapid population growth, recurrent and protracted droughts and environmental degradation have combined to keep most of the population in poverty. Ethiopia is heavily reliant on aid from abroad and has received considerable amounts of food aid in recent decades. It has been in the process of establishing a market economy since the end of the military regime in 1991. Many legal restrictions on private investment were dismantled and the state withdrew from controlling prices and markets. The current focus of the economic reform is the widening of the scope of foreign investment to include, among other areas, telecommunications.

Capital: Addis Ababa
Population: 57 million (1995)
GNP: \$5,700 million (1998)
GNP/capital: \$100 (1995)
GDP (average annual growth rate): 2.3% (1998)
Foreign debt: \$5,221 million (1995); 91% of GNP
Development aid: \$876 million (1995); 19% of GNP
Currency: \$1=7.57 Ethiopia Birr (March 1999)

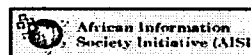
The empire was replaced by a leftist military dictatorship, eventually headed by Mengistu Haile Mariam, who sought a military solution to various ethnic uprisings. Peace came with the military defeat of the Mengistu regime and the installation of a multiparty interim government in 1991. A democratic constitution, providing for federal dispensation, was approved in 1994 and federal elections took place in 1995. A boycott of the elections by most parties meant that the Ethiopian People's Revolutionary Democratic Front (EPDRF) won landslide majorities and its leader, Meles Zenawi, became prime minister.

Sector Overview and Statistics

Ethiopia has a relatively reliable telephone network but it is extremely difficult to get new lines. There are only about 175 000 lines for a population of over 56 million. With a massive rural population Ethiopia has a formidable task in developing national connectivity. So far a total of 543 towns have been inter-connected within the country: 187 towns have automatic and semi-automatic exchanges; 247 are on manual exchanges; and 109 are rural radio call and paystations.

ETC offers telephone, leased circuits, fax, telex, Internet and ISDN (ISDN is only available in Addis Ababa). A GSM cellular mobile service is planned for Addis Ababa with a 40 km radius which will have a capacity for 36,000 subscribers. Recently ETC announced plans to add a further 55,000 lines by the end of the year 2000 and signed contracts in 1997 with three major telecom manufacturers. As part of this programme ETC is in the process of installing a network of 250 VSAT stations to link 250 isolated villages in rural Ethiopia. A further 200 VSATs are planned for the following year. A digital radio multi-access system (DRMAS) has been recently introduced which is being extensively used to link up new subscribers.

ETC is currently the only Internet service provider and it uses Sprint bandwidth. It operates a 256Kbps connection to the US via Global-One and services about 2500 users. The ETC is using its



Ethiopian Telecommunications Training Institute (ETTI) to provide Internet training courses for users. Currently the service is only available in Addis Ababa, but ETC is in the process of adopting a local call tariff throughout the country for Internet calls. In addition, the 256Kbps link is being upgraded to 512Kbps. Aside from the high cost of service, ETC continues to have problems providing dialup and leased line services. The dialup service is often busy or does not answer and leased line services have been promised for many months but have not yet been implemented, even in Addis. Obtaining a subdomain under the top-level domain is not yet possible. ETA does not appear to be particularly willing to devolve any responsibility for building the infrastructure, declaring itself to be the monopoly ISP and requiring other email store and forward service providers to cease operations.

The National Computer and Information Centre (NCIC) at the Ethiopian Science and Technology Commission (ESTC) is responsible for networking in the academic and research sectors. It is also the UN Education, Science and Culture Organization (UNESCO)/Regional Informatics Network for Africa (RINAF) focal point. NCIC has provided connections to a number of national research institutions. Since then some have moved over to ETC's Internet service. However, many subscriptions have lapsed and others are only used for urgent communications since the costs are still high relative to the budgets available, even though the ETA has reduced prices for public institutions. ESTC has had a plan since mid-1996 to establish a full Internet hub in Addis on the University of Addis Ababa campus. This would form the nucleus of a phased expansion toward a national network academic and research network linking ESTC's 18 national research centres. The major problem in connecting academic and research institutions is the high cost of access to the public Internet service and the lack of a national public sector academic/research Internet service.

Some Statistics:

Telephone lines (1998):

Total capacity: 194,378

Total connected: 154,615

Lines per 100 people: 0.3 and ETC plan to reach 1.0 by 2000

Digitalization of switched network (1998): 29%

Policy and Regulation

ETC is a wholly government-owned corporation formed in 1996. The Ethiopian Telecommunications Agency (ETA) was also formed as an independent regulator for the telecom industry in 1996 through the Regulation of Telecommunications Proclamation. Both the ETC and ETA have existed fulfilling the roles of both telecom and regulator since 1952. ETA's legal predecessor, the Ethiopian PTO, is the third oldest in the world. ETC has recently been given responsibility to respond to the new market based emphasis of the economy and has launched the "integrated accelerator development programme" which will be implemented from 1998-2000.

The Public Enterprise Proclamation (1992) provides for government ownership of public enterprises as long as they remain profitable. ETC is reported to be operating profitably since its commercialization. In the 1996 proclamation, the Ethiopian government implies that telecommunication operators can apply for licences to provide various services but no private operators are currently licensed. There is a competitive environment for terminal equipment, installation and maintenance with no limitations as long as equipment meets minimum requirements and approval set by the regulatory body. Current regulation and ETA policy is committed to safeguard the economic viability of ETC in relation to satellite services and equipment. Third party traffic using leased lines and callback is prohibited.

Communication Costs

Internet:

- Individual: Setup - \$56. Subscription - \$34/mnth for 15 free hrs/mnth, \$19/mnth for 8 free hrs a month. \$4/hr for additional hours. 1MB free storage.
- International NGO's, Embassies and Business Sectors: Setup - \$113. Subscription - \$75/mnth for 40 free hrs a month. \$4/hr for additional hours. 2MB free storage.
- Public Education, Health and Agricultural Sectors: Setup - \$38, Subscription - \$25/mnth for 40 free hrs a month. \$2/hr for additional hours. 2MB free storage.
- All non-profit organisations: Setup - \$56. Subscription - \$38/mnth for 40 free hrs a month. \$2/hr for addnl hours. 2MB free storage.

PSTN: Connection charge - Investors/business \$133; government, education/research organizations: \$90; residential: \$45. Rental per month - Investors/business \$2.50; government, education/research organizations: \$1.10; residential: \$1.10.

Local calls cost \$2.60 / hour.

Applications

- The Ethiopian Trade Point was established in October 1997 to collect and disseminate trade information using ICTs to facilitate foreign trade procedures and to implement an electronic trading system.
- The Institute of Ethiopian Studies is being assisted by the Faculty of Afro-American Studies (FAS) at Harvard University to establish the Ethiopian Art and Architecture Database Project. The Project plans to build a comprehensive photographic archive and database of Ethiopian art and architecture. Developed in consultation with the Ethiopian Church, the Ministry of Culture, and other relevant authorities FAS is seeking to raise \$1.3 million to cover the initial three year phase.

Donors

COMESA: The Common Market for Eastern and Southern Africa (COMESA) is working to promote the development of telecommunications in its member countries and to improve interconnectivity and harmonisation of regulatory frameworks between countries. It is undertaking a \$3 billion programme to interconnect the telecommunications system in the region. The programme will have transit centres for direct connectivity in Johannesburg, Lusaka, Nairobi and Addis Ababa. In Ethiopia COMESA is also managing the UNCTAD developed system called Automated System for Customs Data and Management (ASYCUDA).

UNECA: Addis Ababa is the location of the headquarters of the UN Economic Commission for Africa (UNECA) which has long supported electronic networking in the region through its Pan African Documentation and Information Service (PADIS). PADIS has closed its email service (PadisNet) and has now been subsumed under the new Department of Information Services and Documentation (DISD). DISD is now spearheading the African Information Society Initiative (AISII) and Harnessing IT for Development (HITD) programmes. In addition, the Technology Learning Centre (TLC) will be established in Addis Ababa at the International Conference Centre to serve as a permanent demonstration site for showcasing new technologies and innovated uses. UNECA is in the process of obtaining a full Internet connection.

Satellite: There is an operational HealthNet node in Ethiopia. This is a support network providing email connections for health workers and researchers in developing countries.

Swedish government: The Swedish government provided a \$30 million loan/grant to the Ethiopian government to expand/improve telecommunications infrastructure.

UNIDO: The UN Industrial Development Organization (UNIDO) is conducting national needs

The International Development Research Centre (IDRC) and the United Nations Economic Commission for Africa (ECA).

assessment studies on information networking for business in selected countries including Ethiopia.

World Bank: InfoDev's African Virtual University (AVU) project has established a connection at Addis Ababa University. AVU is a \$1.2M project using satellite technology to deliver distance education with telephone call-back for voice intervention from the pupils to 25 sites. In addition, in collaboration with the African Development Bank (ADB), the Economic Commission for Africa (ECA) and the Organization for African Unity (OAU), the World Bank is supporting the use of a "Live Database" system for regional economic analysis, and at a national level with Ethiopia, Mozambique and Rwanda.

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KENYA

The public telecommunications operator is the Kenya Posts and Telecommunications Corporation (KPTC).

- The quality of the telephone network has improved substantially over the past few years.
- A number of government reforms to the telecommunication sector have been initiated although implementation has been slow implementation and KPTC maintains a monopoly over most infrastructure and services.

Background

Kenya is economically among the more advanced countries in Sub-Saharan Africa. The economy is based on tourism and the export of a wide range of agricultural and manufactured products. Since colonial time Nairobi has been an important provider of commercial and financial services to neighbouring countries. Both Nairobi and Mombasa form part of a fairly well-developed transport and telecommunications network. Multiparty politics have recently been restored in Kenya under President Daniel arap Moi but the government has only seen one change in leadership since 1963.

Capital: Nairobi
Population: 29 million (1995)
GNP: \$7,000 million (1998)
GNP/capital: \$260 (1995)
GDP (average annual growth rate): 1.4% (1990-95)
Foreign debt: \$7,381 million (1995); 94% of GNP
Development aid: \$707 million (1995); 4% of GNP
Currency: \$1=63.75 Kenya Shillings (March 1999)

Sector Overview

Kenya's telephone network has about 400,000 lines for almost 30 million people. The quality of the network has improved substantially over the past few years and KPTC has recently established a national and international digital leased line service (KenStream). It has also rolled out a VSAT network called KenSat for outlying areas which will be able to connect to the public switched network and Kenpac or Kenstream. The terminals will be sold on the open market and the biggest clients are expected to be multinational companies with large branch offices. KPTC also has a GSM mobile service called Safaricom but the service is quite limited in its coverage and there is no voice mail, data or SMS services. A second cellular license is expected to be issued.

Service	Availability	Operator	Statistics
Telegraph	Nationwide	KPTC	
Telex	Nationwide	KPTC	
PSTN	Nationwide	KPTC	In 1998, total installed: 384,000 Total connected: 264,000 Lines per 100 people: 0.98 Waiting list: 81,000 Digitalization of switched network: 54%
Cellular	All major towns	KPTC	The ETACS (analogue) and GSM (digital) have a combined capacity of 8,000 lines with connections of about 5,000 subscribers.
Fixed Wireless	Nairobi	KPTC	
Internet		About 10 companies	Internet accounts (1999): 10,000

Kenya

Service	Availability	Operator	Statistics
X.25 packet switching	Nationwide	KPTC	Connections: 749; Capacity: 1,408
Leased lines	Nationwide	KPTC	

Internet:

The establishment of Internet in Kenya was delayed due to the regulatory environment and high cost of international leased lines. As a result Nairobi developed a large concentration of dialup email service providers, albeit unofficially. However, in late 1995 full Internet services were established by some companies, despite KPTC's objections advertised in the national newspapers. KPTC then liberalized the market for third party services but required them to obtain a license and requesting them to pay a provisional licence fee for five years, payable in advance immediately, of Kshs. 500,000 and an operating fee for one year at 1% of the gross turnover, or, as an interim measure, at Kshs 250,000. Some of the ISPs have paid the fee, others have protested and not paid. Businesses wishing to provide Internet services must be 70% locally owned.

Nevertheless, Kenya now has one of the largest Internet communities in Sub-Saharan Africa, with some estimates as high as 25,000 users. KPTC has put in place a 2MB national Internet backbone service for leased line access (JamboNet) in 5 cities. At this point, it is unclear if KPTC will provide end-user services, or confine itself to resale to ISPs. Currently there are 15 full Internet providers in Kenya, a few of which have points of presence in some of the secondary cities. Most ISPs offer leased line services but so far these have mostly been analogue services. Recently one ISP (AfricaOnline) announced that it will be able to provide users with 768Kbps links. AfricaOnline is the largest ISP with about 3,000 users, closely followed by Form-Net. Five organisations (ARCC, AfricaOnline, Form-Net, Utando and ICRAF) have obtained leased line links to the US for full Internet services. Local access to users outside the capital is not available except in Mombasa and via the X.25 network.

Based in Nairobi, the East African Internet Association (EAIA) has a membership of 19 service providers in Ethiopia, Kenya, Tanzania, and Uganda. The Kenyan branch is formally established as a not-for-profit body incorporated in Kenya. The group initially came together to promote Internet use including the idea of establishing a hub for many smaller service providers who wish to share the costs of an international link. However, with the spread of commercial Internet and competition between members, this has not yet happened. More recently, there have been discussions on setting up national peering points for the ISPs in each city. In collaboration with the Institute of Economic Affairs and EcoNews Africa, the Kenyan members of EAIA have also been active in providing feedback on the draft communications bill.

Policy and Regulation

The East African Posts and Telecommunications Corporation operated as a corporation covering Kenya, Uganda and Tanzania from 1948. However, after the collapse of the East African Community in 1977 KPTC was formed. In principle KPTC is autonomous with a separate board of directors, although the government is the sole shareholder. In practice, there is considerable direct and indirect political interference in KPTC's day-to-day affairs. In 1995 a performance contract was drawn up which contained a memorandum of understanding between the government and KPTC. However, the contract was little more than KPTC's own plans and its performance indicators. KPTC seldom meets them and the government has no effective machinery for monitoring or censure.

Sole discretion of licencing lies with KPTC and the tendency has been to refuse licence applications. Basic services, infrastructure, satellite services and equipment, and value-added services such as

VSAT and packet switching have been a KPTC monopoly. The infrastructure provision and maintenance of cellular mobile is controlled by KPTC although there are plans to form a joint venture company with Vodafone (UK) to operate these services. All leased circuits are the monopoly of KPTC and usage is officially restricted to intra-company traffic. However, it is no longer possible to control usage due to advances in technology. In addition, there are several private Internet service providers and terminal equipment installation and maintenance is fully liberalised.

The government, IMF and World Bank prepared the following document in 1996: Economic Reforms for 1996-1998, the Policy Framework Paper. It outlines the national development strategy and key economic reforms that the government plans to implement up to December 1998. It also set up a presidential economic commission to oversee the implementation of the policies. For telecommunications, these covered the separation of KPTC, selling of 30% shares to a strategic investor and public flotation, joint ventures for cellular phone and liberalisation of payments, all to be done by September 1996. Two bills have been established: the Kenya Communications Bill and the Postal Corporation of Kenya (POSTA) Bill. These provide for the separation of KPTC into three entities: Telkom Kenya Ltd., POSTA and the Communications Commission of Kenya which will regulate the two sectors. The Communications Bill also establishes a national communications secretariat which will advise the government on the various aspects of telecommunications. In 1997, the Postal and Telecommunications Sector Policy Statement was issued by the Ministry of Transport and Communications. This tries to map out the orderly expansion and modernisation of the telecommunications sector up to year 2015, including specific targets for telephone penetration, privatisation, market structure etc. The pace of implementation has been slow and in some cases non-existent.

Communication Costs

PSTN: Connection charge - \$113; Rental per month- \$4;

Dialup Full Internet (Ksh/mnth): Africaonline - 10,000; FormNet - 7,000; Interconnect - 7,250 + VAT; Swift Global - 7,000 + VAT; Net 2000 - 7,500 + VAT; NairobiNet - 9,000; Thorntree Unlimited dialup during off-peak hours - 880, peak rate access - 1 250. VAT is 17%.

KPTC International leased line: 64kbps to the States - \$8,500 plus VAT for the Kenyan half-circuit plus \$5,000 carrier charges for the US half-circuit. That is about \$14,775/month. Monthly charges within COMESA countries are \$5, 375 plus VAT.

Local analogue leased lines across town are relatively cheap (about \$120/month). Digital leased lines (64Kbps) are priced relatively expensively by KPTC - about \$1,200/month for a line across town, resulting in fees from ISPs ranging from \$2,500-\$3,500/month.

Applications

In general there has been little leadership emerging from the academic, research and public sectors in the area of national networking and use of ICTs. This is partly explained by the political climate, the lack of broad institutional support from government for the academic sector, and the tight controls the state puts on its organs regarding communications. Currently there are no policies by government to use the Internet to disseminate government information. However, initiatives within Kenya include:

- Healthnet Kenya which was among the first email providers in the country to start with a satellite based email system, switched to a dialup connection from Satellife in Boston and is now in the process of obtaining a leased line link.
- Mission Aviation Fellowship, the United Bible Societies and the Urban Mission Support Groups provide email services for their constituencies.

Kenya

- The Kenya Meteorological Office (KMO) has built up substantial experience with electronic communications and is the focal point for all of Africa's meteorological departments. The Met Office operates a large hub of leased line connections all over Africa as well as around the country. Most of these links are currently low speed telex links or X.25 circuits but the network will shortly be upgraded to high speed digital (64Kbps) TCP/IP based links both nationally and internationally.
- The International Centre for Research in Agriculture and Forestry (ICRAF) and the International Livestock Research Institute (ILRI) have their own direct links to the US for full Internet access. The International Centre for Insect Physiology and Entomology (ICIPE) is connected via a 64Kbps leased line to ISP AfricaOnline. ICIPE will be the centre of an African Pest Management Network supported by USAID and others.

Donors

Andrew W. Mellon Foundation: This foundation is providing WWW facilitation for the Institute for Primate Research in Nairobi.

ASARECA: An exploratory study was undertaken to assess the potential of ICTs in rural communities in Maseno as part of the African Highlands Initiative (AHI) of the Association for Strengthening Agricultural Research in East and Central Africa (ASARECA).

COMESA: The Common Market for Eastern and Southern Africa (COMESA) is working to promote the development of telecommunications in its member countries and to improve interconnectivity and harmonisation of regulatory frameworks between countries. It is undertaking a \$3 billion programme to interconnect the telecommunications system in the region. The programme will have transit centres for direct connectivity in Johannesburg, Lusaka, Nairobi and Addis Ababa.

DGIS: The Dutch Ministry for Co-operation (DGIS) is funding various Dutch technical universities to provide support to African Universities for upgrading their ICT infrastructure.

EAC: The East African Co-Operation (EAC) is planning a high-speed digital backbone linking Kampala, Nairobi and Dar es Salaam by 2001. European Investment Bank financing of \$41 million has been arranged for the project, with another \$9 million being provided by the East African Development Bank and a further \$16 million contributed by the three east African national telecom operators.

GENA: The Global Education Network for Africa (GENA) is establishing a network to allow public broadcasters to share the cost of accessing educational programming.

ITU: It is expected that the International Telecommunications Union (ITU) will transform the two regional telecom training centres (AFRALTI in Kenya and ESMT in Dakar) into Centres of Excellence in Telecommunications Administration (CETA). The centres have been conceived with the aim of developing the telecommunications marketplace in Africa, Asia and Latin America, as well as training policy-makers and regulators in the development of national priorities and regulations.

Oxfam UK: Oxfam UK is conducting a communications infrastructure survey of east Africa which includes Kenya, Tanzania and Uganda.

Satellife: There is an operational HealthNet node in Kenya. This is a support network providing email connections for health workers and researchers in developing countries.

UNEP: The UN Environment Programme (UNEP) provided VSAT connectivity for the environment ministry.

The International Development Research Centre (IDRC) and the United Nations Economic Commission for Africa (ECA).

Kenya

World Bank: Kenyatta University in Nairobi is the Kenyan participant in the InfoDev/World Bank African Virtual University (AVU) project. This is a \$1.2M project using satellite technology to deliver distance education with telephone call-back for voice intervention from the pupils to 25 sites.

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TANZANIA

The PTO in Tanzania is the Tanzania Telecommunications Company (TTC).

- Tanzania has suffered from poor telecommunications infrastructure but has been undergoing rapid modernisation.
- The government is liberalising the telecommunications sector.
- Access is still predominantly in urban areas (especially Dar es Salaam).

Background

Tanzania has about the same number of people as neighbouring Kenya but its territory is larger than almost all of its neighbours. Measured in terms of per capita national income, Tanzanians are among the poorest in the world, but their access to social services compares favourably with other African countries. The inhabitants of Zanzibar and Pemba islands, which enjoy the status of an autonomous territory, are somewhat more prosperous. In recent years Zanzibar and Pemba have campaigned for secession and restoration of the islands' independence.

Capital: Dar es Salaam
Population: 29 million (1995)
GNP: \$3,800 million (1998)
GNP/capital: \$130 (1995)
GDP (average annual growth rate): 3.2% (1990-95)
Foreign debt: \$7,333 million (1995); 198% of GNP
Development aid: \$875 million (1995); 23% of GNP
Currency: \$1=681.98 Tanzania Shillings (March 1999)

Tanzania is heavily dependent on financial aid from abroad. The country's external debt is crippling and economic difficulties have been aggravated by recurring droughts. However, with more investment funds flowing into the country, especially to mining and tourism, and increasing exports, the economy is beginning to expand moderately. Tanzania is quickly moving towards a market economy. Lack of good roads, run-down railways and inadequate telecommunications are serious impediments to Tanzania's economic development. The rehabilitation of these services is a national priority.

Service Overview and Statistics

Tanzania has suffered from poor telecommunications infrastructure but has been undergoing rapid modernisation. There has been a dramatic improvement of the local infrastructure of the capital city, Dar es Salaam, with many digital exchanges being installed, the availability of two cellular telephone networks, and now, a half dozen Internet service providers. Nevertheless, network access in areas outside Dar es Salaam is still very limited. Currently telecommunication links in northern Tanzania (Arusha) are more reliable to Kenya than to the capital in the South.

Service	Provider
Telegraph	TTC
Telex	TTC
PSTN	TTC, Zantel
Cellular	MIC, Tritel, TTC
VSAT	Wilken Afsat, Datel, Sita
Payphone	TTC, ACG Telesystems, Jupiter Communications

TTC is the sole provider of basic fixed services on the mainland. Zantel, a private company, operates in Zanzibar. In 1997, there was 72% digitalization of switched network and 70% digitalization of transmission network. Fibre cable is being laid in Moshe and Arusha and the Dodoma-Dar es Salaam-Zanzibar-Tanga-Moshe-Arusha microwave links are being digitised, as are links to Morogoro and Mwanza. ACG Telesystems Limited operates a cardphone network in and around Dar es Salaam and plans to extend the services to other towns in Tanzania.

Tanzania

The cellular providers in Tanzania are:

- MIC** Popularly known as Mobitel, it has operated an ETACS cellular mobile phone network since 1994. It currently has 14,600 subscribers. The shareholders are Millicom International Cellular SA of Luxembourg (51%), TTC (25%), Ultimate Communications Ltd (14%) and IFC (10%).
- Tritel** Operates a \$12.5 million Siemens-based GSM cellular mobile network. Currently it has around 5,000 subscribers, growing at 500 a month with a capacity of 20,000. The shareholders are TRI (Malaysia 65%) and VIP Engineering Limited (35%).
- TTC** Operates a GSM system. It has a cellular license for all but the coastal zone where it has a joint venture with Mobitel.

Internet:

The national regulator called for tenders for international data carriers in 1996 and three licenses were issued for a period of up to 10 years (subject to review after 5 years) to three locally registered companies with international ownership. The regulator has indicated that no more licenses for international data communications will be issued during this period. The cost of the data licences is \$100,000 plus a royalty fee of 5% on annual turnover. The royalty fee is applicable to all value added services. The three licenses were issued to:

- SITA** The well known airline communications co-operative.
- Datel** A joint venture between TTC (49%) and France Telecom's subsidiary, Nexus International (51%) but further capital raising efforts are expected to reduce Nexus' shares to 36%. Datel provides public data communications network services based on VSAT satellite technology. X.25 and TCP/IP protocols are available.
- Wilken/Afsat** A subsidiary of Wilken International, a family run business (by Lord Cecil Michael) based in Nairobi which has traditionally supplied voice radio communications services in East Africa. It is now branching out into data communications and aside from the International data carrier license, it has also obtained a local wireless data transmission license in the 2.4Ghz waveband with which it will connect customers directly to its 12 meter international earth station in Dar es Salaam with a downlink in the USA.

For 2 years the Internet services market was restricted to those who could afford the high costs of leased lines to Datel or Sita (about \$17K a month for 128 Kbps, \$12K for 64 Kbps), but now Wilken has entered the resale market with a more competitive \$5K a month for 64 Kbps and has already established a link to ISP Twiga. The national PTO is monitoring the situation and has not ruled out the possibility of providing wholesale Internet services in Tanzania.

Internet service providers:

- CyberTwiga is Tanzania's first commercial full Internet service providing international connectivity via a 64 Kbps Sita link and a 256 Kbps Simplex link via Interpacket's Espresso service. It has recently established a POP in Arusha and is providing wireless links using Wi-Lan for leased-line customers. CyberTwiga is also setting up an HF radio email service.
- In Arusha, an email service running as a small business by local farmer Mr Erik Rowberg has been operating for over 2 years, supplying local email services in the Arusha/Moshi area. The service, called Marie, has recently been upgraded to a full Internet link via Datel's service.
- Other service providers are Raha, Internet Africa, Cats-Net, TZ Online, Africa Online, and Zanzinet.

Projects:

- Southern Corridor Telecomms Project: This will expand and modernise switching and transmission in Mtwara and Lindi. Funds are being sought with China and Japan having shown interest.
- Kagero Telecom Project: This will install digital telephone exchanges in Kagera to cover all districts. Canada has agreed to fund this project.
- Rural automation project: This will replace magneto telephone exchanges with automatic ones. Funds are being sought.
- WordTel Telecomms Project: This aims at installing 300,000 telephone lines. Funded by WordTel.
- The Post Office of Tanzania is planning a large VSAT network which link 17 towns to Dar es Salaam.
- The Tanzania Communications Commission is planning to establish a fund to support private sector activities in rural areas which is expected to be contributed to by the operators.

Communications Costs

SITA:	9.6Kbps International leased line - \$4,500/month. 64Kbps - \$14,000/month.
COSTECH:	\$20/month and \$0.1 per Kb of international traffic.
Datel	19.2Kbps wireless link - \$350/month for each end (\$700/month total)
Muhimbili:	Email: \$20/month. Installation - \$50.
UDSM:	Users on campus \$10/month. External users - \$150/month.
CyberTwiga:	Email only: \$50/month. Unlimited Web/Email - \$75/month. Setup is free if self-installed. \$200 for an on-site installation.
PSTN:	Connection charge - \$64.80 (without telephone set). Local call -\$1.94/hour peak and \$1.45/hour off peak.

Policy and Regulation

The Tanzania Commission for Science and Technology (COSTECH) is responsible for national research centre and academic networking. Aside from the activities of COSTECH, there is no high-level national information infrastructure planning and policy development process in Tanzania.

The public telecommunications operator existed until 1977 under the East African community and until 1993 was Tanzania Posts and Telecommunications Corporation. At this time post and telecommunications services were separated and, in 1994, a new company, Tanzania Telecommunications Company Limited (TTC) was formed. This is 100% government owned but plans are at an advanced stage for the government to sell some of its shares in TTC. In anticipation, TTC has started to change the general company attitude to be customer centred. TTC is already a tax-paying profit seeking enterprise and has over 70% share of market value.

Regulatory functions in the telecommunications sector were separated from operations in 1995 with the establishment of the Tanzania Communications Commission (TCC) as the regulator of the telecommunications and broadcasting sector. The TCC is responsible to the Ministry of Communication and Transport and is in the process of formulating a national communications policy, a draft of which has already been circulated. The TCC board of directors approves multi-annual and annual corporate plans. The board is largely under government control since the members are appointed by the minister of transport and communications. The board therefore implements public policy.

The TCC allocates frequencies for radio and TV broadcasting and it has also issued 4 radio paging licenses but none have rolled out their services yet. Recently international call charges were cut and

Tanzania

national and local call rates raised. This was done partly to combat callback service operators and partly to match the tariffs of TTC correspondents. Since its inception in 1994, TCC insists that no operator refuse interconnection unless the equipment is not to standard and connection should be at cost. In addition, the economic union of Kenya, Tanzania and Uganda has resulted in telecommunication links between these countries not being tariffed at international rates.

In the mid-1980s there was a broad government policy to encourage private sector investment in telecommunications through various modes including total or partial privatisation of state owned companies and removing monopoly. The government has allowed private sector participation in providing services (e.g. mobile cellular phones; sale and installation of customer premises equipment). The cellular sector was the first to liberalise. Another area of increasing competition is public data networks. In its effort to liberalise the sector through TCC, the government has:

- granted licences to operate links, private networks or value-added services and devices
- granted licences to qualified private contractors to install equipment and networks at subscribers premises
- promoted the development of competition in the sector

Applications

COSTECH has operated a dialup email service since 1993 with initial support from the Capacity Building for Electronic Communication in Africa (CABECA) programme of the UN Economic Commission for Africa (UNECA), and later augmented by the Regional Informatics Network for Africa (RINAF). This service connects daily to the Internet via a call from GreenNet in London. COSTECH has been planning the establishment of a national Internet backbone service for the research and academic sectors as well as government departments for some time. It recently was awarded the contract to develop the official government web site with support from the World Bank. COSTECH also has a large training room in which it conducts a large number of training courses.

There have been a number of initiatives in the health sector such as:

- The HealthNet node at Muhimbili University College of Health Sciences which was the first email provider in the country. In the past, the service suffered from problems with the old telephone exchange in the Muhimbili area, but since then a new digital exchange has been installed and accessibility has improved substantially. The service connects daily to the Internet via a call from Satellife in Boston.
- The HealthNet Users Group Mwanza (HUG-M) at the National Institute of Medical Research in Mwanza operates a Satellife LEO groundstation email link.
- The African Medical & Research Foundation (AMREF) office in Ifakara near Lake Victoria is in the process of establishing a Satellife groundstation. The equipment, installation, training and support costs (\$17K) are to be shared with 5 other initiatives - the Tanzania-Netherlands Project to support AIDS control in Mwanza region (TANESA), Kuliana, the Farming Systems Research (FSR), the Agricultural Research Institute (ARI) and the Training Institute of the Ministry of Agriculture (MATI).

In Morogoro, the Sokoine Agricultural University (SUA) has recently started operating a local email Fido service. In addition, CEEST, an environmental NGO, operates a Fido service for some NGOs from Dar es Salaam.

Donor Programs

COMESA: The Common Market for Eastern and Southern Africa (COMESA) has developed the Automated System for Customs and Data Management (ASYCUDA) which is being used by Tanzania.

EAC: The East African Co-Operation (EAC) is planning a high-speed digital backbone linking Kampala, Nairobi and Dar es Salaam by 2001. European Investment Bank Financing of \$41 million has been arranged for the project, with another \$9 million being provided by the East African Development Bank and a further \$16 million contributed by the three east African national telecom operators.

Government of the Netherlands: The University of Dar es Salaam (UDSM) has set up a full Internet service for the campus with support from the Government of the Netherlands. In August 1996 a 64 Kbps connection was established to South Africa's academic network - Uninet - via a VSAT connection provided by Panamsat's South African reseller (Transtel). UDSM is in the process of switching to a lower cost, higher bandwidth (128 Kbps) VSAT link directly to the US.

MAF: The Mission Aviation Fellowship (MAF), a Christian relief organisation, operates a wireless hub from Dodoma.

Oxfam UK: Oxfam UK is conducting a communications infrastructure survey of east Africa which includes Kenya, Tanzania and Uganda.

TRP: The objective of the \$250 million Telecommunications Restructuring program (TRP) is to raise teledensity from 0.3 to 0.7 by 1998 and to meet fast-rising demand for reliable services in urban and rural areas. This is a multi-donor, multi-vendor 5 year programme (1994-98). The sponsors are IDA, ADB, SIDA, Danida, EU, Japan and the Kuwait Fund. The technology is mostly digital and the contractors are Mitsubishi, Segitel, Marubeni, Alcatel, Ericsson and TCIL-India.

TTC is the focal point for one of the Telecentre Fund's multipurpose community telecentre projects being planned in four or five African countries as part of a joint co-operation initiative of the ITU, UNESCO, IDRC and possibly the FAO.

UNDP: The Tanzania Environment Information Service Project is being supported by the UN Development Programme (UNDP) as part of its Sustainable Development Networking Programme (SDNP) activities.

UNECA: Provided initial support to COSTECH.

World Bank: Open University of Tanzania and the University of Dar es Salaam are the Tanzanian participants in the InfoDev/World Bank African Virtual University (AVU) project. This is a \$1.2M project using satellite technology to deliver distance education with telephone call-back for voice intervention from the pupils to 25 sites.

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MALAWI

The public telecommunications operator is the Malawi Posts and Telecommunications Company (MPTC).

- Malawi has one of the poorest telephone infrastructures in Africa.
- A Communications Bill was recently passed which defined procedures for licencing and establishing a regulatory body.

Background

The national capital, Lilongwe, is home to about 40% of the total population. For about half of the 30 years Malawi spent under Dr. Kamuzu Banda's authoritarian rule, the country enjoyed stability and, albeit from a low level, economic advancement. However, during the 1980s the mainly agricultural economy started to decline. During this time Malawi's routes through Mozambique were disrupted by the civil war there and Malawi was forced to use longer and more expensive routes and ports in South Africa and Tanzania. In addition, severe droughts and price drops in Malawi's export commodities contributed to its economic difficulties. The country's social services were burdened by about 600,000 refugees from Mozambique. Malawi has also been relatively unsuccessful in efforts to promote private sector development. However, the economy is showing signs of revival.

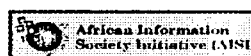
Capital: Lilongwe
Population: 10 million (1995)
GNP: \$1,600 million (1998)
GNP/capital: \$160 (1995)
GDP (average annual growth rate): 0.7% (1990-95)
Foreign debt: \$2,140 million (1995); 132% of GNP
Development aid: \$429 million (1995); 34% of GNP
Currency: \$1= 43.50 Malawi Kwacha (March 1999)

Sector Overview and Statistics

Malawi has one of the poorest telephone infrastructures in Africa - about 70,000 lines with unreliable links between cities. The availability of new lines is low and a waiting time of 24 months is not uncommon. However, a new earthstation was commissioned in Blantyre in 1997 which has relieved the congestion in international circuits. MPTC operates an X.25 service in Lilongwe and Blantyre. A tender was issued to Teleconsult USA for technical advice on modernising telecommunications services to Lilongwe and its surrounding districts as well as Zomba and surrounding districts.

Service	Provider
Telephone/Fax	MPTC
Cellular	TNM
Data	TNM
Internet	MalawiNet
Leased circuits	MPTC
Private Wire	MPTC

The cellular operator is Telekom Networks of Malawi (TNM) which is operated by Telkom Malaysia.



Malawi

Share holders are Telkom Malaysia (60%) and MPTC (40%). It has a five year contract (up to 2000) and covers Blantyre, Mzuzu, Lilongwe and Zomba and is planning to expand its services.

The Malawi Broadcasting Corporation (MBC) is the only large scale broadcaster. It has been claimed that most applications for private radio stations are turned down. Currently only two commercial stations have been given licences. A third station, for rural women, supported by donors, has also received a licence recently, and the African Bible College runs a religious station which MPTC does not allow to broadcast news.

Some Statistics (1997):

Telephone lines: Total capacity - 70,960; Telephone connected - 36,974

Digitalisation of switched network: 55.76%

Digitalisation of transmission network: 85%

Internet:

Dispersed economic and administrative centres linked by low quality trunk routes has limited the critical mass of demand for Internet in Malawi, making it the last country in Southern Africa to obtain full connectivity. MalawiNet which was established in 1997 is owned by MPTC (38%), ComNet of USA (42%) and BJ Trust of Malawi (10%). MalawiNet has about 2,000 users and operates a 128Kbps link directly to the US with POPs in Lilongwe and Blantyre. Calls from anywhere in the country are tariffed at local call rates. MalawiNet is the only full ISP but there are also a number of email providers (BUMAS, Integrated Computers and Epsilon Omega).

Projects:

- Replacing existing exchanges to be funded by the Kuwait Fund (over \$10 million)
- Blantyre rehabilitation project involving the rehabilitation of the external network as well as adding new exchanges to be funded by the Danish Agency for International Development Assistance (Danida).
- Replacement of analogue exchanges and automation of the rural network to be funded by MPTC
- Southern Regional Telephone Service Improvement Project which has an estimated cost of \$12 million.
- Installation of WANs and LANs.

Policy and Regulation

There is no national process for the development of information infrastructure plans. Post and telecommunications both form part of MPTC although there are discussions of separating them. The telecommunications sector is regulated by the Malawi Communications Regulatory Authority (MCRA), under the Ministry of Information, Posts and Telecommunications. A draft Communications Bill was passed and includes the establishment of clear criteria and a formal procedure for tendering and issue of communication licences, as well as establishing a regulatory body to oversee them. Prior to the establishment of the regulatory body, the MPTC Act gave MPTC exclusive monopoly over frequencies, provision of telecommunications services, licensing etc.

The MPTC recently liberalised the Internet service provider market, allowing private ISPs to obtain their own connections, either via MalawiNet's POPs in Lilongwe or Blantyre or via a direct international link from MPTC (costing \$20 000/mnth). VSAT-based services have recently been allowed, with companies such as Lever Brothers and Oilcom installing equipment to service their internal communications needs.

Communication Cost

Costs increased by 60% following the devaluation of the Malawi Kwacha.

PSTN: Connection charge - \$57.47; rental per month: \$5.7; local calls cost \$1.56/hour

MalawiNet: Email only: Setup - 2000 MK, Subscription - 420 MK/mnth, Free Time - 2hrs/month, additional time 2.4 MK/minute

Dialup Internet: Setup - 4160 MK, Subscription - 2500 MK/month, Free Time - 20 hrs/month, additional time 1.6MK/minute.

Applications

An informal group called the Internet Support Group (ISG) was formed to increase access to full Internet in the country and it is planning a series of awareness campaigns on the benefit of the Internet and email. Reflecting the predominantly rural and farming nature of the country, the ISG is focussing on the Agribusiness sector in Malawi. The coordination of the ISG, which represents a number of companies and NGOs in Malawi, is being carried out by Malawi Investment Promotion Agency in Lilongwe.

Donors

COMESA: The Common Market for Eastern and Southern Africa (COMESA) has developed the Automated System for Customs and Data Management (ASYCUDA) which is being used by Tanzania.

UNDP: The National Research Council of Malawi (NRC) is being assisted by the Sustainable Development Networking Programme (SDNP) of the United Nations Development Programme (UNDP) to establish a node at the Malawi Polytechnic in Blantyre. SDNP Malawi is expected to help link the Medical College in Blantyre, as well as other academic, research and public institutions across the country. The project was approved 2 years ago, but resistance from the Government over the provision of independent Internet links delayed the project until the ISP sector was liberalised. In 1998 permission to obtain a 64Kbps international link to the US was obtained at a cost of about \$7,500 a month.

Satellite: There is an operational HealthNet node in Malawi. This is a support network providing email connections for health workers and researchers in developing countries.

The Bunda College of Agriculture, near Lilongwe is receiving substantial support for upgrading facilities from the Japanese international co-operation and is also being assisted by the Ford Foundation to obtain Internet connectivity.

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Malawi

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The International Development Research Centre (IDRC) and the United Nations Economic Commission for Africa (ECA).

ZAMBIA

The public telecommunications operator is Zambia Telecommunications Ltd (Zamtel).

- The telecommunications network in Zambia has improved substantially over the last few years but is still at a very low level of development.
- The telecommunications sector is liberalised.

Background

Zambia is a landlocked country which is linked by road, rail and air services to neighbouring countries. The bulk of the population lives along the line of the rail. Zambia's economy has revolved around the copper industry. When the international price of copper declined in the 1970s, Zambia borrowed heavily from abroad and now has a high foreign debt burden. This along with the dominant role of state enterprises and armed conflict in neighbouring countries, led to economic decline. Current economic policy is to implement structural adjustment programmes, including privatisation of state corporations. Zambia had been a single party state from 1972 but multiparty politics were restored in 1991. The Movement for Multiparty Democracy won a landslide victory in the 1991 elections and Frederick Chiluba became president.

Capital: Lusaka
Population: 9.5 million (1995)
GNP: \$3,500 million (1998)
GNP/capital: \$370 (1995)
GDP (average annual growth rate): -0.2% (1990-95)
Foreign debt: \$6,853 million (1995); 190% of GNP
Development aid: \$2,029 million (1995); 63% of GNP
Currency: \$1=2,228.34 Zambia Kwacha (March 1999)

Service Overview and Statistics

The Telecommunications network in Zambia has improved substantially over the last few years but is still at a very low level of development. International telecommunications traffic growth has been substantial, reaching 17.7 million minutes in 1995. The government, through Zamtel and other operators, intends to increase teledensity in the country to 2 per 100 people (about 131,000 new lines would have to be installed). This represents a growth rate of 22% in order to meet the rate of population increase. The Electricity Supply Authority in Zambia plans to provide wireless local loop telecommunications services.

Zamtel has VSAT services for data, fax and voice. Internet services are provided by ZamNet. There are three private cellular providers:

- Zamtel which is the older AMPS service.
- Zamcell is a joint venture between Zamtel, MSI and Mitsui. Zamtel is being superseded by Zamcell.
- Telecel Zambia is a subsidiary of Telecel International Ltd which has branches in 10 African countries. Telecel Zambia is 30% locally owned and has 700 subscribers. Telecel is awaiting a licence to install its own satellite to become independent in providing international services.

Some Statistics:

Total connected telephone lines (1998): 78,900

Connected lines per 100 people (1998): 0.82

Digitalisation of switched network (1998): 70%

Digitalisation of transmission network (1998): almost 100% analogue

Public Telephones (1998): Zamtel has 400 token-operated payphones and is in the process of installing another 400 and 150 smart card phones across the country. Ascotel of Denmark is supplying them.

Zambia

Internet (1996): Hosts: 173; Users: 850

Internet:

Internet is provided by ZamNet which is run by the University of Zambia (UNZA). It was established as a private company by the University, which is the major shareholder and provides the premises for the services. A 64Kbps service was established in 1997 which was upgraded to 128Kbps and then again to 256Kbps in 1998. Other entities have applied to become ISPs but the regulatory authority has refused on the grounds that it would threaten the viability of the existing ISP, given the small and emerging nature of the market. Zamtel has recently launched a full Internet service in competition with ZamNet and ZCCM has established CopperNet. The cost of a license to operate an ISP is \$40,000.

Projects:

- Microwave links are being upgraded to digital and a new earth station is being commissioned to replace one of the two Standard A satellite stations.
- Zamtel recently awarded a \$17 million contract to Motorola to provide a wireless local loop facility. The first phase of the project is providing 2,000 links in Lusaka.
- Zamtel is in the process of digitising its transmission and earthstation network and introducing an X.25 based data service (a \$1.5 million project being implemented by London & International Projects Ltd).

Policy and Regulation

There is no policy process for developing a national information infrastructure plan or a national academic/research network project in Zambia. The official structure in Zambia responsible for academic/research networking is the National Scientific Research Council (NSRC) which suffers from institutional underdevelopment and lacks even basic computer equipment.

In 1994, the Zambia Parliament passed the Telecommunications Act which liberalized the telecommunications sector and allowed any individual or organization to apply for an operation or services provision licence. The Telecommunications Act also established the Zambia Communications Authority which is responsible for the regulation and monitoring of the telecommunications sector. It falls under the Ministry of Transport and Communications. In addition, the Telecommunications Act split the Post and Telecommunications Corporation (PTC) into the Zambia Postal Services corporation and Zamtel. Zamtel is a limited liability company and is 100% owned by the government but there are discussions to privatise it.

Communications Costs

PSTN: Connection charge: \$109; Rental per month: \$3.65.

Local calls cost \$2.5 per hour at peak hours and \$1.5 per hour during off peak hours.

In 1996 analog cellular connection costs were \$35, monthly subscription was \$46.7 and a three minute local call was US\$2.10; digital cellular connection costs were \$25, monthly subscription was \$8.3 and a three minute local call was \$1.50.

Zamnet: \$25 per month for full Internet access.

Applications

- SchoolNet Zambia has been established to promote information and communication technologies in schools in Zambia.

Donor Programs

COMESA: The Common Market for Eastern and Southern Africa (COMESA) is working to promote the development of telecommunications in its member countries and to improve interconnectivity and harmonisation of regulatory frameworks between countries. It is undertaking a \$3 billion programme to interconnect the telecommunications system in the region. The programme will have transit

centres for direct connectivity in Johannesburg, Lusaka, Nairobi and Addis Ababa. In Zambia, COMESA is also managing the UNCTAD developed system called Automated System for Customs Data and Management (ASYCUDA).

DGIS: Dutch Ministry for Co-operation (DGIS) is funding various Dutch technical universities to provide support to African Universities for upgrading their ICT infrastructure.

UNECA: UNECA's Sub-Regional Development Centre for Southern Africa (SRDC-SA) is located in Lusaka and is charged with supporting sub-regional electronic information exchange networks of economic experts, civil society organizations, NGOs, private sector organizations and major corporations.

Key Contacts

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ZIMBABWE

The public telecommunications operator is the Posts and Telecommunications Corporation (PTC).

- Zimbabwe has a limited but slowly improving telephone network with problems such as poor reliability and long waiting lists for lines.
- The government is in the process of reforming the telecommunications sector (it is establishing a regulatory authority as well as removing the monopolies of PTC and the Zimbabwe Broadcasting Corporation).

Background

After 13 years of civil war, power was transferred to a democratic government in 1979 and free elections followed in 1980. Robert Mugabe has been in power since 1980 and at the end of 1987 his African National Union (Zanu) merged with the opposition party to form the Zanu-Patriotic Front (Zanu-PF). This resulted in very weak opposition in parliament.

Zimbabwe has, after South Africa, the largest and most diversified economy in Sub-Saharan Africa. However, the economy has been struggling over the last decade due to its economic policies after independence and disastrous droughts. Zimbabwe is a landlocked country with a large part of the population concentrated in the highveld. Owing to its central location in Southern Africa, Zimbabwe's comparatively well-maintained railways and trunk roads are strategic links in the sub-continental transport network. The country has well developed facilities for power and water supplies. Zimbabwe remains a mixed economy with private business existing side by side with state owned companies. Currently public services, including postal service, railways, airlines and telecommunications are state owned. Although there are only approximately 65 companies listed on the Harare stock exchange, the number of private firms continues to increase.

Capital: Harare
Population: 11,2 million (1995)
GNP: \$5,900 million (1998)
GNP/capital: \$540 (1995)
GDP (average annual growth rate): 1.0% (1990-95)
Foreign debt: \$4,885 million (1995); 82% of GNP
Development aid: \$490 million (1995); 10% of GNP
Currency: \$1=37.86 Zimbabwe Dollars (March 1999)

Sector Overview and Statistics

Zimbabwe has a limited but slowly improving telephone network in general with some areas of severe problems (poor reliability and long waiting lists for lines). Trunk calls between cities are workable in most cases. An X.25 network is in place in the 4 major cities. PTC is the sole supplier of basic telecommunications services and also operates a small GSM cellular service. The cellular radio and trunked radio operators are:

- Net One (PTC) which has an agreement with Vodacom of South Africa.
- Net Two (Econet- Enhanced Communications Network) was licenced instead of Telecel after it fought a string of court battles for four years. Telecel (formerly Net Two) had its licence invalidated by the high court due to irregularities in the award of the licence.

Zimbabwe

Service	Availability in main cities	National availability	Statistics
Telegraph	Harare, Bulawayo, Gweru, Masvingo, Mutare	Yes	
Telex	Harare, Bulawayo, Gweru, Masvingo, Mutare	Yes	
PSTN	Harare, Bulawayo, Gweru, Masvingo, Mutare	Yes	In 1998, total capacity: 295,600 Total connected: 212,000 Lines per 100 people: 1.74 Waiting list: 295,000 Digitalisation: 50%
Cellular mobile	Harare, Bulawayo, Gweru, Masvingo, Mutare, Kwekwe, Marondera, Chegutu		Total connected (1998): 19,000 (Net One)
X.25 with access nodes	Harare, Bulawayo, Gweru, Masvingo, Mutare	Nil	In 1998, 160 accounts and 585 nodes
Internet	Harare, Bulawayo, Gweru, Masvingo, Mutare	Yes	In 1998, hosts: 836 Users: 10,000 Service providers: 17 Bandwidth (Kbps): 2,000 Density (population/Internet user): 1.192

Internet:

Two years ago, PTC contracted Global One to establish a large scale national and international Internet backbone with a 256kbps link to the US and POPs in the four major cities. The service is operated as a wholesale facility for resale by the private ISPs. Accounts on the system are sold in blocks of 20 to each ISP which then resells them to the end user. Since the start of the service, the link was upgraded to 1Mbps and a further upgrade to 2Mbps took place in mid-1998 with the addition of a 1MB link to Teleglobe of Canada. PTC has also established a special tariff for calls to the Internet backbone which are charged at the cost of a local call plus 20% for calls from anywhere in the country.

There have been a number of dialup email service providers since the early 1990s. The first full Internet provider in Zimbabwe was Data Control. This is a local family owned business started in 1995 as an affiliate to UUNET Internet Africa.

Larger ISPs in Zimbabwe:

- Data Control: about 3,000 users, 100 dial-in lines and a 128Kbs link to the international gateway.
- Samara: about 2,000 users
- Interdata: about 1,500 users. It is in the process of upgrading its link to 256Kbps and is part of the International Tobacco Group
- AfricaOnline: 3,000 users, 300 dial-in modems and a 256K link to the international gateway. It is UK owned.
- PrimeNetCommunications: about 1,500 users and a 128Kbps link. The company was formed by a group of former directors of ICL which has had a large presence in Zimbabwe for many years.
- Deloitte & Touche
- Utande Internet Services (which recently merged with Intersol)

The smaller ISPs are Icon Internet, PC Centre (a subsidiary of Samara), Telco Internet Services and Zimsurf. Two companies have established web services and are waiting for their leased lines from the PTC to provide dialup services (Zambezi Net and Zimbabwe Online). A total of 11 other companies have registered to become public service providers. The University of Zimbabwe operates a 64Kbps link and is the ISP for academic institutions. There are also a number of email networks (HealthNet, Esanet, Mango and Zimbix).

Policy and Regulation

There is no formal government policy process for developing a national information infrastructure. However, national academic and research networking is being supported by the Research Council of Zimbabwe (RCZ) which has recently begun receiving assistance under the Sustainable Development Networking Programme (SDNP) of the UN Development Programme (UNDP).

There is currently no separate telecommunications regulator and the sector is the responsibility of the Ministry of Information, Posts and Telecommunications. Zimbabwe is one of the few remaining countries in the Southern African region which still maintains posts and telecommunications functions within one organization. PTC was converted from a government department to a corporation in 1972. It is 100% government-owned and is the regulatory authority. However, the government recently published a draft Communications Bill which is to establish a separate regulatory authority.

The Communications Bill also seeks to remove the monopolies held by Zimbabwe Broadcasting Corporation (ZBC) and PTC in the broadcasting and telecommunications sectors respectively. There is a monopoly of basic services and basic infrastructure but competition in value added network services and cellular/mobile services. Recently a second cellular provider was licenced after protracted court battles for approval. The Zimbabwean government has agreed to partially privatise Net One after the amendment of the existing act. In February 1998 the government decided to grant an operating licence for a Group System Mobile (GSM) network to Telecel Zimbabwe, while at the same time requesting Telecel to drop court cases. Telecel Zimbabwe has accepted the government's proposal.

Communications Costs

PSTN: Connection charge - \$15.14; Rental per month - \$1.7

Local calls cost about \$0.60 per hour.

In 1996 cellular connection costs were \$50, monthly subscription was \$45 and a three minute local call was \$0.4.

Internet: Dialup accounts cost about \$40 for unlimited full-Internet access at most of the commercial service providers. Mango's email accounts cost 20ZD per month plus 0.15ZD per Kb sent or received. (\$1=37.75ZD)

Applications

- The Southern African Research and Documentation Centre (SARDC) is host to a store-and-forward email provider for NGOs and individuals called MANGO. In 1990 a co-operative of local and international NGOs established the host which was the first store-and-forward email gateway to the Internet in Sub-Saharan Africa outside South Africa. There are now over 300 users accessing the service. MANGO has the lowest charges for email access of any network in Africa, partly due to the provision of premises and some support staff time by SARDC.
- The University of Zimbabwe is host to three store-and-forward email systems - Zimbix, EsaNet, and HealthNet.
- SARDC also runs the Women in Development Southern Africa Awareness Programme (WID-SAA) which is inviting contributions to the compilation and updating of a Database for Gender experts and organizations in southern Africa. WID-SAA aims to be a catalyst and information service to the region's governments, parliaments, NGOs and agencies, the media and the public in

Zimbabwe

- the formulation of policy affecting women in Southern Africa.
- The Zimbabwe ISIS User Group (ZIMISIS) is active and organizes workshops. The group is also developing model community databases for use in rural areas.
- ZimTrade is a website that assists national and international companies interested in trading in Zimbabwe. Services include providing information about Zimbabwe to foreign buyers, computerized trade databases, research analysis and trade and marketing information.

Donor Programs

Carnegie Corporation: The Science and Technology programme in developing countries is supporting the University of Zimbabwe to establish a campus-wide network connected to the Internet, including the remote campuses.

COMESA: The Common Market for Eastern and Southern Africa (COMESA) has developed the Automated System for Customs and Data Management (ASYCUDA) which is being used by Zimbabwe.

GTZ: The Health Systems Research in the Southern African Region project is located at the Blair Research Institute in Harare. This project provides support for training, physical meetings, computer training and electronic information exchange.

IDRC: The IDRC supported a workshop in Harare in 1997 on rural connectivity in southern Africa. This workshop was organized by the SADC Centre of Communication for Development.

OECD: A Japan Overseas Economic Cooperation Fund (OECD) loan of \$115 million is funding the digitalisation of Mashonaland and Manicaland. This project will increase lines by 125,000 (teledensity given as 2.27).

UNESCO: UNESCO's programme on Creating Learning Networks for African Teachers is supporting four teacher training colleges to obtain dialup Internet connections.

World Bank: World Links for Development is developing Zimbabwe-WorLD and SchoolNet-Zimbabwe National Initiatives. In addition, the National University of Science and Technology in Bulawayo is the Zimbabwe participant in the InfoDev/World Bank African Virtual University (AVU) project. This is a \$1.2M project using satellite technology to deliver distance education with telephone call-back for voice intervention from the pupils to 25 sites.

Key Contacts

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SOUTH AFRICA

The public telecommunications operator is Telkom SA.

- South Africa has a first-world telecommunication network in the commercial centres but very low penetration of services in rural and remote areas.
- A number of reforms to the telecommunication sector have been initiated. Telkom has been privatised and there are plans for a national ICT strategy and the development of an IT hub in South Africa.
- The government is committed to providing universal access to telecommunications services (established the Universal Service Agency and both Telkom and cellular service operators are obligated to provide access to previously disadvantaged areas).

Background

South Africa left the apartheid era in 1990 following the unbanning of several liberation movements, including the ANC, and the release from prison of Nelson Mandela. There were multiparty negotiations from 1990 to 1993 and the first non-racial elections in 1994 where the ANC emerged as the majority party. After many years of international isolation South Africa joined the Commonwealth, the Non-aligned Movement, the Organisation of African Unity, ITU and many other international organizations.

Administrative capital: Pretoria
Legislative capital: Cape Town
Population: 38 million (1995)
GNP: \$130,921 million (1998)
GNP/capital: \$3,160 (1995)
GDP (average annual growth rate): 1.7% (1997)
Foreign debt: \$33,029 million (1995); 24.7% of GNP
Development aid: \$384 million (1995); 0.3% of GNP
Currency: \$1=6.21 South Africa Rand

Based on agriculture, mining, manufacturing and commerce, the South African economy is the most diversified on the continent. It has developed extensive communications, transport, water and power supply networks. A variety of minerals, including gold (the foremost export) account for nearly 60% of merchandise export value.

Manufacturing contributes almost a quarter of GNP and is the second most important export sector. The country has a sophisticated financial services sector and its skilled human resource pool is the largest in Africa. However, it also suffers from a number of problems such as high unemployment; ineffective systems to deliver high quality education, health services and housing for the majority of the population; and heavy dependence on the export of primary products and on foreign investment.

Service Overview and Statistics

South Africa has a first-world telecom network in the commercial centres but very low penetration of services in rural and remote areas, especially in the previously "independent homelands". The cellular providers are Vodacom (50% owned by Telkom) and MTN (various shareholders including Cable & Wireless and SBC Communications International Inc.). Both use GSM 900 technology and hold 15 year renewable operating licences. They have about 2 million subscribers between them. The development goals of ANC government include a number of objectives to improve access to communications in the country. Both Telkom and the cellular service providers have extensive obligations to provide access to previously disadvantaged areas. New cellular licences are being processed.

Telkom has a share in three of the satellite constellations (Intelsat, Inmarsat and ICO). Eskom (the national electricity supplier of South Africa) and Transtel (a satellite communications subsidiary of the transport parastatal, TransNet) both operate private networks which are tiny compared with Telkom's, and are not allowed to compete with Telkom. A third parastatal signal carrier (Sentech) provides all



South Africa

broadcasters with their terrestrial and satellite broadcasting facilities.

Projects:

- The SA Post Office, which falls under the Department of Communications (DOC), has committed R2 million rand to the development of a smart-card based "Public Internet Terminal" (PIT) which will be deployed at every post office in the country.
- Department of Arts, Culture, Science and Technology (DACST) has established a Science and Technology Innovation Fund to support large projects (R1-5million) in three priority areas, one of which supports the development of the information society.
- Microsoft South Africa has a number of programmes in South Africa focusing on digital villages and the educational use of ICTs.
- Mweb, a South African ISP, launched a Digital Satellite TV based Internet service similar to PC-Direct which is currently available in the US and Europe.
- Telkom has announced the SAFE project (South Africa - Far East) in collaboration with Malaysia Telecom which plans to lay a fibre cable between South Africa and Malaysia with various spurs along the way. This will assist Telkom's strategy to become a hub for African traffic, having also built a high-capacity VSAT groundstation, as well as linking surrounding countries with optic fiber.

Internet:

Shortly before the elections, Internet Africa and Internet Solutions established the first full Internet commercial services. Currently, full Internet facilities are available throughout the country with about 150 Internet service providers around the country. These ISPs include a number of multinationals, some of whom have bought shares in local companies. South Africa developed a vibrant Internet user community 10 years ago within the academic community, who were the only ones with local access to full Internet. This helped bring the country into the top 20 nations world-wide for the number of Internet hosts. The number of Internet users in the country is currently estimated at 1 million and the market at about R400million a year. There are about 200,000 dialup subscribers. South Africa has become the Internet hub for the sub-region due to its low-cost international leased lines to neighbouring countries, and excess telecoms bandwidth on the SAT-2 fibre link to Europe and the US. However, while the costs of access are generally affordable in most cities due to the presence of local points of presence (POPs), there is no low cost method of access outside of these areas. Recently a 7 Rand maximum tariff for Internet access on the weekends has been introduced.

Since the beginning of 1996 Telkom has been offering a leased line Internet service (SAIX) with a novel pricing system. Its move into value added services combined with the rapid roll-out of national POPs which will eclipse the commercial service providers offerings, has resulted in the formation of an association of ISPs. This association has brought Telkom before the Competition Board for exploiting its monopoly position on the supply of basic telecom infrastructure. SAIX currently has POPs in 66 cities and towns around the country and plans to cover 95% of the population with a local dial access point, while the largest commercial provider (UUNET Internet Africa - UIA) has 23. The case is currently unresolved, with Telkom finally withdrawing from the protracted talks.

A number of groups have been formed such as the SAIX ISP's Action Group (1996), the Internet Service Providers Association (ISPA) and the Internet Society South Africa. The SAIX ISP's Action Group aims to promote the interests of Internet access providers who buy connectivity from SAIX. ISPA comprises members from the Internet industry. It provides peering services for its members through two points (CINX in Cape Town and JINX in Johannesburg) and acts as a lobby group to influence government policy which affects the industry.

Some Statistics:

Total telephones connected (1996/97): 4,258,639

Digitalisation of switched network: 74% (Telkom expects digitalisation to be complete by the end of 1999)

Digitalisation of transmission network: 100%

Cellphone subscribers: 1.4 million

Public telephones (1997): 94,937 (Telkom's licence requires it to install 120,000 new payphones in 5 years. In 1996-97, it installed 24,783 new payphones)

Internet subscribers: 700,000 (est). South Africa is considered to have between the 14th and 18th largest Internet subscriber base in the world.

Policy and Regulation

The Department of Communications (the public service arm of the Ministry of Posts, Telecommunications and Broadcasting) is the leading agency in the area of national networking, telecommunications, broadcasting and information policy. The South African Telecommunications Regulatory Authority (SATRA) was appointed in 1997 and is responsible to the DOC for regulating the telecommunications sector. In addition, the National Information Technology Forum (NITF), a cross-sectoral national ICT policy working group assisted in defining the agenda for the Information Society and Development (ISAD) conference (1996) and continues to provide a forum for discussion of national policy.

In March 1998 the South African cabinet approved a proposal to develop a national information and communication technology strategy. The key elements of the strategy include consolidating all of the existing government networks in one "intranet" based on a high-speed fibre optic backbone to be built by Telkom, and offering a "one-stop shop" to the public through the use of smart cards and public access points. The public will obtain identity documents and drivers' licences as well as information on tenders, health and welfare services through the new system. It is estimated that government currently spends \$1-2 billion a year on information technology systems. There are other government ICT related projects through the DOC which has also established the Commission for Information Technology (CITA). CITA will form the initiating platform for public and private partnerships in ICTs, with specific emphasis on creating an Information Technology hub in South Africa.

The Universal Service Agency (USA) was established in 1997 by an act of Parliament under the Ministry of Posts, Telecommunications and Broadcasting. It is responsible for ensuring universal access to all telecommunications services (voice, fax, Internet etc.). Universal access is currently defined by the presence of public access services within a 30 minutes walk of each person. To assist in the development of universal access, the USA operates the Telecentre Programme. The USA receives its financing from the license fees paid by telecommunications operators (about \$4M a year initially into the Universal Service Fund) and from donor agencies. In the future it is possible that value added network service (VANS) providers will have to pay license fees.

Telkom remained a wholly state-owned enterprise until 1997, when a 30% equity stake was sold to Thintana Communications. Thintana Communications consists of SBC Communications International (60%) of the United States and Telkom Malaysia Berhad (40%). The new board of directors of Telkom has 15 members with 10 appointed by the government and 5 by Thintana. Thintana appointees control the key portfolios of operations, finance and strategy on the five-person executive. Telkom is rebalancing tariffs, especially international rates, to bring them in line with world standards and its internal costs. Telkom (and other operators) may receive compensation from the Universal Service Fund for providing social but uneconomic services.

Telkom received protection from competition for up to six years on local, national and international calls in return for a network building program which could double the network in the exclusivity

South Africa

period. Telkom was given a monopoly which includes local, national, international and public phones, as well as infrastructure for value added networks, including cellular phone networks. The government intends to invite applications for a second fixed line operator licence within the next three years, thus enabling a "hot start" once Telkom's monopoly expires.

Communication Costs

PSTN: connection charge (single line) - \$40.06; Rental per month - business \$13.38, residential, \$11.57

Dialup Internet access costs \$10-\$20 /month.

Local calls cost \$1.6/hr at peak times.

Applications

- The Foundation for Research and Development (FRD) is responsible for supporting academic research projects and operating the Universities Network (UniNet). UniNet provides an Internet backbone which connects an estimated 500,000 students and staff at 21 Universities and 15 Technikons, as well as to universities in Lesotho, Mozambique, Swaziland and Tanzania. UniNet also provides links to some of the 400 schools that now have some form of connectivity to the Internet.
- The Department of Education has established SchoolNet SA, the national body which will co-ordinate the linking of South African schools to the Internet. The SchoolNet SA structure consists of a Transitional Executive Council with participants from the Department of Education, DACST and regional school networking organizations. Provincial "SchoolNets" will be encouraged and supported. Direction for SchoolNet policy will be provided by three advisory groups focussing on issues of connectivity and technology, human resource development and training, and content generation and curriculum. SchoolNet SA is funded by the IDRC and is also the vehicle for the World Links for Development programme of the World Bank.
- Distance Education: The University of South Africa (UNISA) provides distance education to 130,000 registered students, many of which are outside of South Africa, and has an extensive ICT programme. UNISA also has a partnership with the two other major South African distance and continuing education institutions, Vista University and Technikon SA. Called the Confederation of Open Learning Institutions in South Africa (COLISA), it will jointly administer a number of ICT applications. In addition, the MultiChoice digital satellite broadcast network is supporting a distance education project of the Shoma Foundation in collaboration with the South African Department of Education. This project will link two schools in Gauteng and Kwazulu Natal provinces with cellular and satellite technologies.
- The Council for Scientific and Industrial Research (CSIR) has a wide range of ICT related activities. CSIR's Mikomtek department is the unit most involved in ICTs and is in the process of developing a national and sub-regional strategy for supporting the development of ICT applications. Mikomtek has developed a public access information kiosk and a wireless metropolitan data networking system based on the spread spectrum WaveLan system. MikomTek also hosts the Satellite Applications Centre which supports remote sensing and GIS applications development.
- SangoNet was the first non-academic full Internet provider in South Africa and is a member of the Association for Progressive Communications (APC). It focuses on supporting the NGO sector both inside the country and in the region. Sangonet currently provides email gateway services for small store-and-forward service providers in Malawi and Zimbabwe, regularly runs training courses and supplies technicians, trainers and workshop organizers for projects in the region. SangoNet is collaborating with USAID in the establishment of a Southern African technical help desk for NGOs and researchers in Universities and government institutions in the sub-region. It has also launched the Women's Net networking project with support from the Commission on Gender Equality.

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- University of the Witwatersrand runs the Programme for ICTs in Development which has recently begun a project called 'Building a Telecentre Network for Africa', in collaboration with the Centre for Information Society Development in Africa (CISDA). The Wits Graduate School of Public and Development Management at the University of the Witwatersrand also offers in "Information Technology Management for Government", "Information and Communication Policy" and "Managing the Telecommunications Environment, Policy and Regulation".
- The Health Systems Trust (HST) operates HealthLink - an Internet and information service provider for the health sector. Based in Durban, HealthLink operates low cost store-and-forward email hosts in all of the provinces except the Western Cape.

Donors:

COMESA: The Common Market for Eastern and Southern Africa (COMESA) is working to promote the development of telecommunications in its member countries and to improve interconnectivity and harmonisation of regulatory frameworks between countries. It is undertaking a \$3 billion programme to interconnect the telecommunications system in the region. The programme will have transit centers for direct connectivity in Johannesburg, Lusaka, Nairobi and Addis Ababa.

DFID/British Council: The British Council organised a 3-day conference in Pretoria in February 1999 entitled Building the Information Community in Africa (BICA). The conference focused on the use of ICTs at the community level in Africa and was supported by the USA, IDRC and other development agencies.

DGIS: Dutch Ministry for Co-operation (DGIS) is funding various Dutch technical universities to provide support to African Universities for upgrading their ICT infrastructure.

IDRC: The IDRC Acacia program was launched in 1997. Acacia is an international program to empower sub-Saharan communities with the ability to apply ICTs to their own social and economic development. This program is involved in telecentre development, school networks, improved use of information and communication technology (ICT) by SMMEs and agricultural applications.

World Bank: The WorldLinks for Development (WorLD) program is supporting the linking of a number of public schools in South Africa.

Key Contacts

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STATISTICS

	Egypt	Ethiopia	Kenya	Libya	Malawi	South Africa	Sudan	Tanzania	Tunisia	Zambia	Zimbabwe
Population (1995)	57.5M	57M	29M	5.4M	10M	38M	29M	29M	9M	9.5M	11.2M
GDP (1997)	\$45,500M	\$5,700M	\$7,000M	\$23,333M	\$1,600M	\$130,921M	\$10,367M	\$3,800M	\$16,600M	\$3,500M	\$5,900M
GDP/capita (1995)	\$790	\$100	\$260	\$5,310 (1989)	\$160	\$3,160	\$360	\$130	\$1,860	\$370	\$540
GDP (average annual growth rate)	1.3% (1990-95)	2.3% (1998)	1.4% (1990-95)	N/a	0.7% (1990-95)	1.7% (1997)	4.6% (1991-95)	3.2% (1990-95)	1.2% (1980-93)	-0.2% (1990-95)	1.0% (1990-95)
Foreign Debt (1995)	\$34,116M	\$5,221M	\$7,381M	N/a	\$2,140	\$33,029M	\$18,500M	\$7,333M	\$9,938M	\$6,853M	\$4,885M
Development Aid (1995)	\$2,017	\$876M	\$707M	7M	\$429M	\$384M	\$225M	\$875M	\$69M	\$2,029M	\$490M
Landline Telephone Lines (1996):											
Total	3'024.9	148.7	261.4	380.0	35.5	4'258.6	99.0	92.8	585.2	77.9	175.0
Per 100 inhabitants	4.99	0.25	0.82	6.79	0.35	10.05	0.36	0.30	6.43	0.94	1.47
%growth rate per 100 inhab. (1990-96)	8.8	-0.7	1.5	5.8	3.6	2.4	6.2	0.9	9.4	2.8	2.7
Waiting list for telephone lines 1996 (k)	1'310.2	195.5	70.6	...	29.9	126.8	75.0	107.9	81.8	24.7	113.2
CAGR 1990-96 (%)	2.8	10.2	-2.5	...	18.1	0.2	...	-0.6	-6.5	-11.8	9.9
Total public telephones 1996 (k)	4.7	1.5	5.9	0.5	0.5	110.5	1.5	0.6	7.4	0.5	2.4
Landline main lines % 1995	...	99.0	74.0	...	80.0	71.8	...	87.0	77.0	84.0	79.0
Per 100 inhab. 1995	...	1.84	2.08	...	2.09	12.87	...	1.06	7.34	1.59	2.84
Landline main lines % 1995	...	1.0	26.0	...	20.0	28.2	...	13.0	23.0	16.0	21.0
Per 100 inhab. 1995	...	-	0.28	...	0.08	5.22	...	0.05	3.44	0.23	0.36
Local call (US\$) 1996	0.01	0.03	0.06	0.03	0.04	0.09	0.03	0.08	0.07	0.25	0.03
Subscription as a % of GDP per capita 1995	1.5	16.5	17.9	...	26.0	4.7	118.0	23.4	1.7	4.0	3.1
Mobile subscribers 1996 (k)	7.4	-	2.8	87.0	3.7	953.0	2.2	9.0	5.5	2.7	-
Per 100 inhabitants 1996	0.01	-	0.01	1.56	0.04	2.25	0.01	0.03	0.06	0.03	-
Mobile Cell Tariffs 1996 (US\$)											
Connection	...	-	7	-	-	-	...	-	123	35	-
Monthly Subscription	...	-	7.3	-	-	-	...	0.1	30.8	46.7	-
3 minute local call	...	-	1.84	-	-	-	...	0.12	1.29	2.10	-
Digital Cell Tariffs 1996 (US\$)											
Connection	-	-	-	-	137	19	-	-	-	25	50
Monthly Subscription	-	-	-	-	52.3	36.1	-	0.1	-	8.3	45.0
3 minute local call	-	-	-	-	0.59	0.91	-	0.16	-	1.50	0.40
Telecommunications revenue											
Total 1996 (M US\$)	773.8	78.2	297.8	235.0	31.9	3'802.2	21.9	71.9	295.6	108.6	138.1
As a % of GDP (1995)	1.1	1.3	3.3	...	0.9	2.7	0.3	1.3	1.5	3.1	1.9
Telecommunications investment											
Total 1996 (M US\$)	296.3	7.6	72.2	110.6	...	856.2	18.0	5.0	181.8	11.3	131.7
As a % of revenue (1996)	55.7	10.5	24.2	47.1	...	22.5	82.4	7.1	61.5	10.4	95.4
Internet											
Total hosts 1996	1'976	1	273	-	-	99'284	-	3	41	173	176
Total users 1996	40'000	1'000	2'500	618'000	-	500	2'500	850	2'000
Estimated PCs											
Total 1996 (k)	350	...	50	1'600	20	...	60	...	80
Per 100 inhab. 1996	0.58	...	0.16	3.77	0.07	...	0.67	...	0.67

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COMMUNITY ACCESS TO INFORMATION AND COMMUNICATION TECHNOLOGIES THROUGH TELECENTRES

Opportunities for the private sector

What is a telecentre?

A telecentre unites people living in poor communities with the technologies that enable them to communicate, access information, and exchange ideas with close neighbours and potential partners all over the world. At one end of the spectrum the telecentre may be a simple phone shop - at the other a community centre equipped with phone, fax, copiers, computers and Internet access. Telecentres may also be located in schools or clinics and become members of education or health networks. There are many telecentre models but there is consensus that access to the Internet is the goal which offers the most benefit.

Telecentres may be owned by entrepreneurs (either individually or as part of a franchise) or by community organisations. In the latter case they are often subsidized (by donors or by governments, indirectly through universal service obligations generated by the telecom sector).

Many experimental telecentre programs are underway in Africa. In South Africa the main actor is the Universal Service Agency which is currently developing a number of private and public sector models. On the donor side, IDRC, UNDP, UNESCO, ITU and the World Bank are all funding pilot centres in Egypt, Tanzania, Mali, Benin, Mozambique and South Africa, to cite just a few examples.

Why so much interest?

Access to information and communication technologies has the potential to empower communities to take more effective control over their own development and strengthen their voices in political processes.

The technologies also embody the potential for effective delivery of a whole range of development services: health, education, agriculture, natural resource management, micro-enterprise support, pensions and welfare payments, licensing.

It is the support the technologies can provide to poverty reduction through local empowerment that has encouraged governments and the development community to invest in telecentres.

A role for the private sector?

The private sector stands to benefit as much as other sectors of society if information and communication technologies meet their development objective of integrating isolated communities within that national political, social, cultural and economic space.

But it also has a much more direct role to play in extending access to communications and information into the rural areas where the vast majority of Africans live - in a sustainable way.

Private sector opportunities abound for developing new infrastructure, technologies and tools adapted to community use. These include the design of secure physical facilities, new approaches to delivering the communications infrastructure, hardware, software and content:

- The joint development of pilot projects, including infrastructure development related to telecentres, multipurpose community centres or other similar models which utilize



- information and communication technologies to increase community access to information and selected services;
- Developing and marketing technologies and tools which can facilitate community use of ICTs, especially those which are locally developed (e.g. decision-support systems for community planning, graphic and touch-screen interfaces, text/voice conversion; computer-assisted translation, etc.);
 - Developing and marketing locally-defined applications, content, services and networks to address specific development problems at the community level (e.g. distance education, packaging of government information, corporate learning partnership centres);
 - Market research related to innovative pilot initiatives in selected areas which demonstrate the effective use of ICTs in African development, with a view to promoting and marketing their application in other communities;
 - The development, adaptation and management of training programmes - on network operation, software, Web site creation, information packaging - to increase the independence of community-based telecentre operators;
 - The development of business planning and marketing tools which can be used at the community level to increase the sustainability of telecentre programs.

The private sector could develop initiatives in these areas on its own, as part of a private sector consortium or in partnership with donors and governments.

At the moment donors and governments are taking the lead in what is in effect an attempt to prime emerging markets for the private sector.

Indicative Budget of Telecentre Set-up Costs

(Source: South African Telecentre Development Project (SATDP), Universal Service Agency / IDRC)

- The extent of support for the establishment of a community access point, such as a telecentre, will naturally vary according to the size of the centre, other inputs provided by stakeholders and sponsors, and ultimately the capacity of the local market to sustain such an operation. An important element of establishing any such initiative is to use the initial start-up investment to leverage funds and to widen the support-base, so that risk is shared, as elements of longer-term commercial viability are integrated. Ideally, such an operation would attain complete self-sufficiency, but there may be circumstances where economic benefits to the community justify a combination of commercial activities and on-going financial support.
- Cognizant of the fact that, fundamentally, anything which provides public internet access as well as phone access constitutes a telecentre - i.e even an iPhone (a payphone with built-in web browser), the extent of the total resources required for a telecentre will depend on site specific assessments. The budget that follows is indicative of capital (site-related and equipment) and recurrent investments of a full-service telecentre. This budget is based on a planning exercise conducted by the Universal Service Agency and the International Development Research Centre in South Africa. It does not include the cost of the selection and business planning process (which has been estimated to amount to approximately ZAR25,000 in the South African case), nor the cost of training associated with setting-up the telecentre.

A Model Budget for a Full Service Telecentre (SA Rands)

Item	Qty	Unit Cost	Year 1	Notes
1 Office Equipment				
Physical upgrading & maintenance of building	1	10000.00	10000	Security, electricity wiring, paint, fixtures
* Desks, chairs	10	500.00	5000	
Cabinets & shelving	5	500.00	2500	Include whiteboard / projector screen
Safe	1	1500.00	1500	
Window Blinds	1	1000.00	1000	
Cleaning equipment	1	350.00	350	
Misc	1	750.00	750	Carpeting, cups, cutlery, um, power bars etc
Contingency	1	7500.00	7500	Air conditioner, electricity generator
2 Telecentre equipment				
* Till & Accounting system	1	7500.00	7500	
* Telephone handsets	6	100.00	600	
Long range cordless phone (900MHz)	1	2500.00	2500	
* Photocopier / reprographic equipment	1	18000.00	18000	
Integrated Scanner/printer/fax/copier	1	4000.00	4000	
Multimedia Pentium PC with 32 MB RAM	5	4500.00	22500	
Text-based Terminal	3	500.00	1500	
Server/dialup router	1	4500.00	4500	
28.8 kb/s dial-up modems	2	1000.00	2000	
CD-ROM products	10	300.00	3000	
16 port 100BaseT LAN hub	1	800.00	800	
LAN Cable (10m lengths)	8	45.00	360	
Ethernet card	5	150.00	750	
Digital Still Camera	1	2500.00	2500	
Digital Video Camera	1	6000.00		
CD-Writer	1	1800.00	1800	
Colour photo printer	1	1800.00	1800	
Client Application Software	5	1000.00	5000	
Leased line equipment	1	3000.00	3000	
* Audio & visual PC aids for sight impaired and bli	1	1500.00	1500	
Large TV (29"), DSTV, antenna, etc.	1	2000.00	2000	
FM/AM/SW Radio	1	200.00	200	
Power stabilizer/UPS equipment/Invertor/Gener	1	5000.00	5000	

Installation	1	7500.00	7500	
3 Total Capital Costs			126910	
4 Fixed Recurrent Costs				
Premises, annual rental (/month)	12	300.00	3600	
Telephone rental	6	672.00	4032	12 months @ R56/month = 672Rand/year
* Staff - managers (person months)	24	1500.00	36000	
Security	12	500.00	6000	
On-site training	1	2500.00	2500	Initial on-site echnical training in PC & telephone system
Dialup Internet Access (months)	12	100.00	1200	Monthly subscription
* Telephone Calls (minutes)	36000	0.40	14400	90 mins /day on each line for 300 days/yr @ ave of 40c/min
* PC equipment maintenance/support	1	5000.00	5000	Annual contract
Photocopier/reprographic equipment mainten	12	250.00	3000	
Staff Development & Induction	12	250.00	3000	
Marketing & events	1	1500.00	1500	
* Insurance (monthly)	12	200.00	2400	
Bank Charges	12	30.00	360	
Capital Depreciation			25382	20%/year of total capital costs
5 Variable Recurrent Costs				
* Electricity	12	300.00	3600	4Kw * 8 hrs/day
Paper (reams)	100	35.00	3500	
Stationary for telecentre administration	12	150.00	1800	
Stationary and related products (for sale)	2000	10.00	20000	Pens, exercise books, packaging, ave cost
Diskettes (boxes of 10)	50	40.00	2000	
Toner for Fax/printer/copier	10	500.00	5000	
Writable CD disks	50	10.00	500	
Transport	24	20.00	480	Trips to the bank
6 Total Recurrent Costs			145254	
7 Total First Year Costs			272164	
8 Annual Income				
* Telephone services (mins of voice)	36000	0.60	21600	See above, 50% markup
* Internet Telecommunications subsidy from USF	36000	0.30	10800	30c/minute subsidy for estimated 30mins/day/PC Internet access
Computer Usage for commercial customers (min	135000	0.20	27000	4 PCs @ 90 mins each /day for 300 days
Local email accounts	150	100.00	15000	100R/year

* Student drop-in access subsidy (students)	200	100.00	20000	Dept of education subsidy
* Training courses (ave # of person-courses)	250	150.00	37500	
Reproduction services (reams)	100	61.25	6125	75% markup on paper costs
Business materials design & production	250	50.00	12500	
Financial transactions & sales/delivery expeditin	1000	10.00	10000	
Information distribution services	1000	5.00	5000	Govt support for posting of notices
Sales of stationary and related products	1000	15.00	15000	50% markup on cost
Space rental	48	25.00	1200	4 days/ month
Equipment rental	96	25.00	2400	2 days/week
* Personal Assistance Time(mins)	18000	0.50	9000	60 mins a day

Total Income	193125
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First Year Profit/Deficit	-79039
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* = to be verified